THE
ELECTRICAL REVIEW

Volume CXXIX — No. 3325

Friday, August 15, 1941

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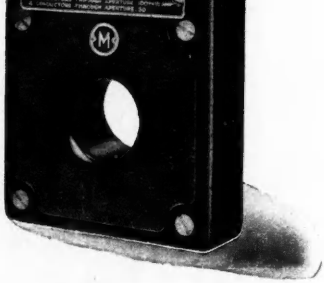

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THE
ELECTRICAL REVIEW
THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXIX. No. 3325. AUGUST 15, 1941 6d. WEEKLY

Coal and Rationing

Prospects for the Coming Winter

WHEN with the collapse of France we lost our remaining Continental market for coal it seemed that far from there being any shortage at home the problem would be what to do with the surplus. The Government looked upon it as an opportunity to draw men from the mines for the Forces or allow them to take up other work, and within twelve months the number employed at collieries was reduced by 75,000. Already since the outbreak of war 25,000 had left the industry.

It was then more or less suddenly discovered that this movement had been allowed to proceed too far and a strong effort was made to get some of the men back at short notice. Mr. Grenfell, the Secretary for Mines, said in the House of Commons debate last week that 90,000 ex-miners had registered under the Order which was issued ; 24,000 had volunteered to return ; 10,000 had been offered to employers; and 5,500 were either at the coal face or on their way there.

Mr. Grenfell had to admit that the shortage of coal was serious although he maintained that no essential works, factory or utility service had suffered any material loss of output by reason of coal shortage since the war began. The efforts of the Department's regional officers had resulted in the direction of coal into the channels where it was most urgently needed.

The Minister expressed his hope (not determination as he might have done) that stocks held by public utilities would soon be " raised to a more uniform level, which would obviate the risks due to the failure of a small number of public utilities to acquire sufficient coal to replenish the low stocks held last winter." The use of the word " failure " here seemed to put the blame on the utilities which was extremely unfair. Through their representative Conjoint Conference the utilities have striven hard to keep their heads above water, and Mr. Grenfell felt bound to pay a tribute to the work of the Committee of that Conference appointed by the Board of Trade under the chairmanship of Mr. J. C. Dalton, which includes Mr. J. W. T. Townley, President of the I.M.E.A.

It is customary for Ministers to say nice things about the innumerable Committees which are set up nowadays to assist them, but we have reason to believe that this was not an empty compliment and that thanks to the efforts of this Committee the position of electricity supply and other public utility undertakings is not so precarious as might be gathered from Mr. Grenfell's speech. This was perhaps hinted at by Sir Andrew Duncan in winding up the debate, and here we may interpose the remark that Sir Andrew cannot be held responsible for the coal situation, having but recently returned to the Board of Trade.

While matters cannot be considered entirely satisfactory, there seems to be no reason for alarm so far as the electricity supply industry is concerned. But we must take account of the possibility of

renewed air attacks during the winter and continue to build up stocks. Account also has to be taken of a possibly greater electricity consumption during the coming winter, which the rationing of domestic supplies would counterbalance to an insignificant degree.

Sir Andrew said that there might have to be a comprehensive scheme of rationing of "coal, light and other forms of fuel," but he assured the House that our war effort was unlikely to be impeded by lack of fuel or power and the public would not have to suffer an unreasonable rationing scheme.

It is to be hoped that rationing will not be hastily put into force as it was in the autumn of 1939. If the need exists it has not just arisen and it seems to us that a compulsory scheme should have been prepared, or the revival of the Fuel & Light Order announced, before this, unless the Government intends to rely upon voluntary restriction of consumption. This would prove less troublesome and probably as effective. The advertisements issued by the Mines Department calling for economy in the consumption of coal, coke, electricity and gas seem to indicate that voluntary restriction is being tried for the time being.

Back to the Board

WHEN the Ministry of War Transport was formed three months ago we suggested that the control of electricity supply would pass to another Department and said that the most obvious existing home for the Commission was the Board of Trade, which originally administered the industry and, incidentally, bestowed its name on the kilowatt-hour. We do not anticipate any immediate drastic changes, but the new move places the control of the principal forms of power—coal, oil, electricity and gas—in the hands of the Board and this may one day prove to be a significant fact.

The Woolwich Appointment

READERS may remember that when the position of borough electrical engineer of Woolwich was advertised recently the A.M.E.E.-E.P.E.A. Joint Committee advised members of the two associations not to apply as the salary offered was below the agreed scale. At last week's meeting of the Borough Council, upon the recommendation of the General Purposes Committee, it was decided to readvertise the post at the scale laid down in the agreement between local authorities and chief electrical engineers. Incidentally, one Councillor said, rather mysteriously, that the Council had no voice in the negotiations in connection with the agreement, although they had a representative on the Committee concerned.

A Second String

"IT would be true to say that if the gas supply at Blackpool failed then Blackpool would fail," says a writer in the *Gas Times*. Later he states that over a third of the population are gas consumers. Strangely enough, the figure is about the same for electricity—for Blackpool has an electricity undertaking, too.

Inflammable Atmospheres

OFTEN the best way of dealing with the hazard of inflammable conditions is to segregate the electrical apparatus. An example of this, in the paint and dope shops of an aircraft factory in Canada, is described in *Electrical News & Engineering* (Ontario) for July 1st. All motors, lamps and wiring are installed above a false ceiling and the only electrical appliances in the shops are a few explosion-proof push buttons for operating contactors and other control units which are housed in a separate building. This has avoided the need for flameproof enclosure of equipment, which is, moreover, impracticable in hydrogen, acetylene and carbon-bisulphide atmospheres.

Distribution Capacity

WAYS of dealing with load development arising out of the defence programme in the United States were discussed at the recent convention of the Edison Electric Institute. One aspect is a reduction in the number of cable sizes and in the thickness of insulation and lead sheathing, associated with greater standardisation. Other proposals concerned the installation of capacitors for relieving overloaded lines and a more extended use of mobile substations. A somewhat drastic suggestion was that cables and transformers should be allowed to carry loads much above their ratings even if this reduced their useful life by many years, but this might be well worth doing, provided reliability of supply were not thereby endangered.

Aesthetics *and the* Engineer

Pleasing Appearance is an Essential Feature of Good Design

By R. B. Rowson, B.Sc., A.M.I.E.E.

THE recent announcement by the Council of the Institution of Civil Engineers officially recognises that besides designing an article as a satisfactory engineering product, the engineer has the duty of creating something which satisfies the beholder's emotional requirements.

Those of an inquiring nature and who at the same time notice their surroundings will often have wondered why they like the look of a certain building and are appalled by another.

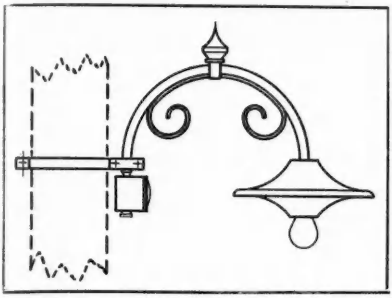


Fig. 1.—A "traditional" street lamp bracket

Discussion amongst engineers often shows a surprising degree of unanimity, providing the objects under review are confined to things like motor cars, aeroplanes, telephones and the like. The same degree of concord, however, is not usually shown when discussing houses, churches, public buildings, etc. This seems to indicate that one is better able to judge the form of things closely connected with one's work than objects having a more remote interest.

This point requires stressing as there is a growing and unfortunate tendency to say that just as an engineer is supposed to be incapable of running an engineering business, such as an electricity supply undertaking, he is incapable of designing an object which is aesthetically pleasing. Admittedly the requisite knowledge is perhaps not inborn, but a sufficient appreciation can be imparted to ensure that the more important rules are not transgressed.

It is now accepted as almost axiomatic that to be aesthetically pleasing an object should also be as suitable as possible for the purpose it is to fulfil and make the best use of available materials, tools, and skill. These, however, do not suffice for, say, a railway station, which has also to be planned with regard to its surroundings, but for most things the above axioms will produce a good design.

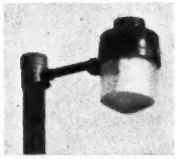


Fig. 2.—Modern street-lighting fitting

The architect is fond of accusing the engineer of producing monstrosities, but fortunately on the last occasion when the columns of *The Times* were used for this purpose Major Beith replied, with some justice, that one had not to search to find equally bad designs evolved by eminent architects. Those interested in churches will often have deplored the architect's efforts at "restoration." Such bickering is unnecessary as both professions have a job to do in the post-war reconstruction. So far as the general public is concerned it is incumbent upon the architect to design good houses and the engineer to design suitable apparatus to put in them.

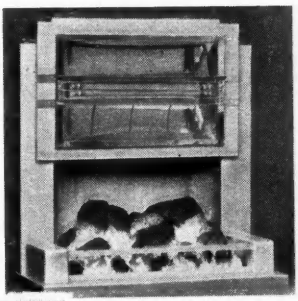


Fig. 3.—Departure from the imitative style (Ferranti)

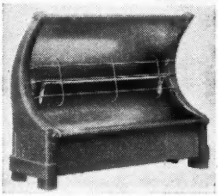


Fig. 4.—A concession to public demand (Ferranti)

Perhaps the worst excesses in engineering are the "bits and pieces" which are almost inseparable from cast-iron designs. Cast street lamp standards are a notorious example. It is not many years ago that to buy a lamp standard which was not adorned with flutes, acorns and similar ornament was almost impossible. Pole brackets were the same, the

usual designs being as fig. 1. One usually had to pay extra to have the scroll and finial left off. In time a simpler design such as fig. 2 was produced, though certain Councils did not approve. With the cleaner designs, however, it is absolutely necessary to have the arm perfectly horizontal and of a thickness which looks strong enough to the uninstructed beholder.

This raises another point. The more simple the design the more necessary is it to have *exactly* the right proportions. This, I think, was the main reason for the ornament, it being far easier to add ornament than to obtain the right proportions.

Fig. 5.—A "period" residence

As a rule engineers have been in the forefront in making their products aesthetically pleasing. Read any modern book on design and you find confirmation in the illustrations of aeroplanes, telephones, motor-cars, etc., or perhaps of a large structure such as Boulder Dam.

A strange tendency is the desire to copy. When the engineer invents a new thing like the motor-car he proceeds to make it look like a horse-drawn vehicle. Stephenson could not make this mistake—at any rate as regards the locomotive—and produced a functional design. The tendency to imitate must be deep, as witnesses the popular "Tudor" style, leaded windows and such like, though the latter would not be tolerated in a car.

The electrical engineer's worst mistakes seem to have been in this direction, which though it pleases the public for a time, does not improve the status of the profession. Perhaps the first electric fire not made to ape the gas and coal fires already on the market was that developed by the late Dr. Ferranti.

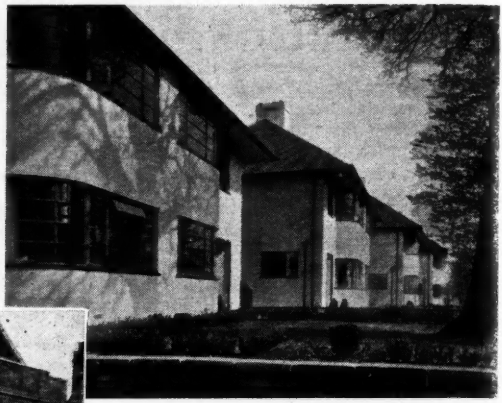


Fig. 6.—Twentieth-century domestic architecture

It is noticeable that his original clean and simple designs are now only listed as inset panel heaters and in a supplementary list for schools and similar installations. This is due, one supposes, to the makers having to compete with lower-priced copies of the original design and the imitation coal fires of other manufacturers. It is interesting to compare fig. 3 which shows a well-designed mass produced version of the prototype with a perverted form shown in fig. 4.

Fig. 7.—Cooker for the modern kitchen

Now of course the fire shown in fig. 4 (or even an imitation log fire) is quite suitable for the person who would choose to live in some modern houses of spurious "period" design, but one hopes that the interior furnishings of the houses in figs. 5 and 6 (one of traditional design and the other more modern) are appropriate to the taste and simplicity of the exteriors. In such a case the fire depicted in fig. 3 and the cooker (fig. 7) would be very suitable.

It has been well said that articles most

frequently handled are of the best design. Thus one seldom sees an ugly pocket knife as time has disposed of the ornamental handles and guards on early models. Nor is the surface of the blade marred with patterns as was common before finality of design was reached.

The telephone (fig. 8) and the tumbler switch have been through a similar metamorphosis, the latter being no longer stuck out from the wall asking to be knocked off. Nor does the plate invariably have the raised design round the edge which was deemed necessary a few years ago. Use has also been made of new materials and whilst the early plastic models were copies of the brass and porcelain types, the newer ones appreciate that the waisted dolly is not in keeping with a brittle material and have substituted a substantial square-section dolly (fig. 9).

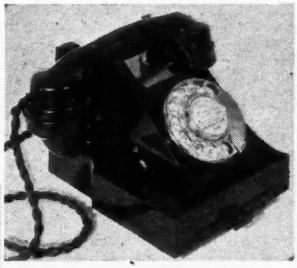


Fig. 8.—Advance in telephone design

Other mistakes are in the sphere of lighting. The average electricity showroom has an uninspired selection of fittings of various tints. Shades bearing scenes of camels and pyramids are still listed but, on the other hand, to satisfy the demand for "modern" designs—which some people think means square or triangular—some very badly designed fittings have been put on the market. Even those with a bias against new ideas are compelled to agree that really modern types of fittings are less likely to catch dust.

It is strange that lighting should so often be unsatisfactory as it is one aspect on which the Institution of Electrical Engineers has had a joint meeting with the architectural profession, though with the pre-war efforts of E.L.M.A. things might have improved in time.

In the factory the position is different. Here the engineer is given a free hand with regard to design and the modern industrial lighting fitting produced by almost all manufacturers, whilst perhaps not a thing of beauty, is quite satisfying.

For things he has to use himself the electrical engineer is more particular. The present tendency for remote control is assisting in providing satisfactory-looking layouts. Indicating and testing instruments, slide rules, drawing instruments, etc., are usually of pleasing design as are other products in which the public takes no interest, such as alternators.

It is rather remarkable, however, that no settled ideas for the shape of a brick-built substation seem yet to have been evolved in this country. The difficulty is that the internal layout is quite flexible. It can also be argued that, unlike the telephone kiosk, it is unnecessary and perhaps undesirable for the public to know how many substations there are about. Perhaps this is a case where camouflage is the highest form of art.

Thanks are due to Ferranti, Ltd. (figs. 3 and 4), the General Electric Co., Ltd. (figs. 2 and 9), the Postmaster-General (fig. 8), the Jackson Electric Stove Co., Ltd. (fig. 7), Mr. H. A. Welch and Mr. F. J. Lander, FF.R.I.B.A. (fig. 6), by whose courtesy these photographs have been reproduced, and to colleagues and friends for criticising the text and preparing certain of the illustrations.

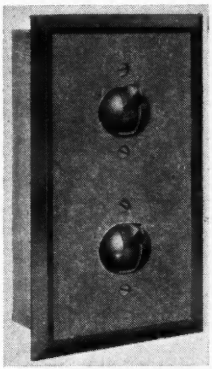


Fig. 9.—Pleasing and unobtruding switch

Power Station Fire Risks

THE Electricity Commissioners have sent a letter to 119 electricity undertakings having a load of 20,000 kW or more on the subject of fire risks at generating stations.

It is recalled that the Technical Investigating Committee appointed by the Commissioners in 1936 to consider what steps could or should be taken to minimise such risks recommended (in paragraph 8 of their Report) that "effective and reliable busbar protection should ultimately be aimed at." Experience subsequent to 1936 has demonstrated that this form of protection has now passed beyond the experimental stage; that in appropriate cases it can be applied without undue difficulty and complication to existing switchgear; and that it has proved a valuable safeguard in numerous instances in preventing major damage.

PERSONAL and SOCIAL

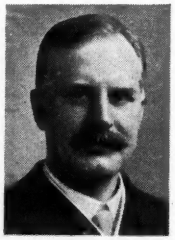
News of Men and Women of the Industry

THE Association of Old Cromptonians held its annual general meeting and luncheon at the Trocadero Restaurant, Piccadilly, London, W.1., on July 31st. The President, **Sir James Swinburne,** F.R.S., was in the chair and sixty members were present. As many Old Cromptonians, who number considerably over 300 members, and ordinarily are to be found in every part of the world, could not be expected to be present at this year's reunion, being "on active service" with H.M. Forces, attendance was limited to those members living within convenient reach of London.

At the luncheon the toasts included those of "The Guv'nor," the late Col. R. E. Crompton, proposed by Sir James Swinburne, "The President," proposed by Mr. E. J. Fox, and "The Company," coupled with the name of Mr. Frank Parkinson, proposed by Mr. A. E. Mohring. The meeting ended with the hope that the next occasion would see the return of peace, and consequently a full attendance of Old Cromptonians.

In our last issue we reported the forthcoming retirement (on March 31st next) of **Mr. F. H. Whysall,** M.I.E.E., who, since he has been city electrical engineer and general manager at Belfast, has been responsible for many important developments in the industrial and domestic spheres.

Mr. Whysall was born at Ripley, Derbyshire, and received his education at the Borough Collegiate School, Rotherham, and Sheffield Technical School, and his practical training with the Midland Iron Co., Ltd., Rotherham, and the Sheffield Telephone Exchange and Electric Light Co.



Mr. F. H. Whysall

In 1897 he became charge engineer at the former Sheaf Street power station, Sheffield, and in 1901 was appointed resident engineer, city power stations, Manchester. His next post was as borough electrical engineer of Greenock, which he held from 1914 to 1927, when he went to Belfast. He was vice-chairman and secretary of the first Scottish Linking-up Committee, and was also chairman of the Greenock Branch of the Institution of Engineers and Shipbuilders in Scotland from 1925 to 1927. He was chairman of the Irish Centre of the I.E.E. in 1930, chairman of the Northern Ireland Sub-Centre of the I.E.E. for 1937-38, and chairman of the Northern Ireland Area Committee of E.D.A. from 1928 to 1937. He was awarded the Ayrton Premium of the I.E.E. in 1913.

Mr. M. G. R. Elliott, A.M.I.E.E., has been appointed London & district sales manager for Lancashire Dynamo & Crypto, Ltd. Mr. Elliott, who has been on the company's London sales staff for the last fifteen years, joined the Lancashire Dynamo & Motor Co., Ltd., at Trafford Park as an apprentice in 1913 and served for over four years in the Manchester Regiment and Royal Tank Corps during the last war.

After thirty-six years with the Post Office, **Mr. J. Brown,** telephone sales superintendent in the Middlesbrough area is retiring. He has received a presentation from the members of the staff. Mr. Brown started his career with the National Telephone Co., at Edinburgh. He was afterwards assistant sales manager for the Post Office Telephones at Glasgow and in 1936 was appointed sales superintendent at Middlesbrough.

Sir Edward G. H. Cox has been appointed an additional director of Edmundsons' Electricity Corporation, Ltd.

Southport Corporation Electricity Committee has recommended that the salary of **Mr. W. T. Gann,** the borough electrical engineer, shall be increased from £1,000 to £1,250 per annum.

On the retirement of **Mr. S. J. Croft,** an assistant secretary, who has been associated with the cable companies for the last forty-two years, **Mr. F. G. A. Vallancey** has been appointed as an assistant secretary of Cable and Wireless (Holding), Ltd., Cable and Wireless, Ltd., and the associated cable companies.

Wallasey Electricity Committee has placed on record a resolution expressing appreciation of the services rendered by **Mr. G. Starkey,** mains engineer, who has retired after forty-four years with the Corporation.

Llanfairfechan Urban District Council has approved the appointment of **Mr. Price F. White** as consulting electrical engineer. A few months ago Mr. White relinquished his position as engineer and manager of the Bangor electricity and gas undertakings.

Mr. A. E. Logsdon has been elected a director of the Farnham Gas & Electricity Co., and has been appointed managing director in addition to holding the office of secretary.

A *Reuter* message from Vichy states that the well-known radiologist, **Dr. Felix Lobligeois** has been obliged to undergo the amputation of his remaining arm, according to a Paris dispatch. The right hand, and then the right arm, were amputated fifteen years ago, and subsequently he lost several fingers of the left hand. In spite of the terrible effects of the continued close contact with radium, Dr. Lobligeois has never interrupted his research work.

The L.N.E.R. announces that as from August 1st, 1941, the following changes of title in the Chief Electrical Engineer's Department have been made: **Mr. H. H. Swift,** assistant electrical engineer, to be styled assistant chief electrical engineer; **Mr. B. James,** assistant electrical engineer (Southern Area) to be styled electrical engineer (Southern Area); **Mr. N. H. Green,** assistant electrical engineer (North Eastern Area) to be styled electrical engineer (North Eastern Area); and **Mr. J. R. Shewan,** assistant electrical

engineer (Scottish Area) to be styled electrical engineer (Scottish Area).

Obituary

Mr. H. Joseph.—We regret to record the death of Mr. Henry Joseph, M.I.E.E., governing director of the Midland Electric Installation Co., Ltd., which occurred recently at the age of sixty-one. Mr. Joseph, who founded the Midland Electric Installation Co. twenty-two years ago, was educated at King Edward's School, Birmingham, and subsequently took a three years' course in electrical engineering at Mason College (now Birmingham University). He served as a pupil with Thomas Parker, Ltd., Wolverhampton, after which he was for a brief period with the Harrow Electric Light & Power Co., as assistant engineer. In 1901 he was appointed assistant engineer to the Folkestone Electricity Supply Co., Ltd., and became the company's engineer and manager at Hythe in 1902. He took up a similar position with the Melton Mowbray Electric Light Co., Ltd., in 1905, and two years later was appointed engineer and manager at Dorking and Caterham with the Urban Electric Supply Co., Ltd. From 1910 until the outbreak of the last war he was engineer and manager to the last-mentioned company at Harwich, and during the war held a commission in the Tyne Electrical Engineers. He commenced business at Wolverhampton as the Midland Electric Installation Co., in 1919 and the concern became a limited company in 1931. Mr. Joseph was presented by his staff with a silver cigarette casket in May, 1940, to mark the company's coming-of-age. He was chairman of the South Midland Centre of the Institution of Electrical Engineers for the 1939-40 session. The business of the Midland Electric Installation Co., Ltd., will be carried on by his son, Mr. R. A. Joseph, B.Sc.

The late Mr. H. Joseph

Mr. A. Chamberlain.—The death occurred on August 7th at his home at Tiverton, Devon, of Mr. Arthur Chamberlain, who was a director of a number of concerns including the General, Electric Co., Ltd. Mr. Chamberlain was sixty years of age.

Mr. J. A. Forde.—We regret to learn of the death of Mr. J. A. Forde, J.P., A.M.I.E.E., engineer and manager of the Isle of Thanet Electric Supply Co., Ltd., which occurred on August 3rd as the result of enemy action.

Will.—Mr. A. Verdie, a director of the Craigpark Electric Cable Co., Ltd., left £8,184, with net personalty £7,982.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Flaws in Tariffs

IN your issue of August 1st Mr. D. J. Bolton said : "No longer must . . . tariffs in one street flagrantly contradict those in the next," and urged engineers to take a hand in shaping a new order. May I add comments, not on the carefully worded Electricity Acts, but on the necessity for engineers to prepare for future legislation which shall correct the defects in the working of existing Acts ?

Is the following experience limited to a single area ? Tariffs to two consumers were given by a witness in Court and reported in the Press recently. The witness pays £4 a year in his home (rated at £19), plus 2d. a unit. His next-door neighbour with the same rateable value pays 12½ per cent. plus 1½d. a unit. For 200 units witness paid £5 13s. 4d. and the neighbour £3 8s. 4d.

The electricity supply is from one authorised company whose E.S.O. covers the area of 364 premises, including that of witness, just beyond the border of an urban district prior to 1934, and 6,273 premises all now in the urban district. The E.S.O. scheduled both the urban district and the part of the rural district incorporated in 1934; *i.e.*, the local government of witness's area changed, but the authorised supplier did not change.

No improvement resulted from a petition to the Minister of Transport relating to the unequal tariffs and inadequate supply. The Electricity Commission replied to a resident in that formerly-over-the-border area to the effect that any question arising under Section 19 of the Act of 1882 could only be determined in a Court of law. That Section provides: "Where a supply is provided in any part of an area . . . every . . . person within that part shall be entitled to a supply on equal terms." Major C. H. Stevens succeeded in securing equal terms with neighbours in Wimbledon only after years of perseverance in the Courts and heavy expenses.

Sections 24 and 25, Electricity (Clauses) Act, 1899, should be deleted from the Statute Book. Some suppliers have imposed the guarantees "up to 20 per cent. on the cost of connection," to which cost no limit is fixed, during the years 1899 to date. Clauses 24 and 25 presuppose that, for example, supply to every built-up area at a definite date is ensured by imposed conditions under Section 3 (1) of the Act of 1882; but many local authorities failed to

exercise their statutory rights to impose reasonable conditions.

The Institute of Journalists proposes to promote legislation designed to remove anomalies arising from the variety of procedure adopted by local authorities. Which associations are best qualified to promote legislation to ensure that clauses in existing and future Acts shall not be ignored by authorised suppliers without the necessity of wasting time and incurring expenses in each area which must result if one makes application to the Courts?

Herne Bay. THEODORE STEVENS.

Commercial Professional Staffs' Salaries

THE recent success of technical staffs in regard to their case for the payment of N.J.B. salaries at Worthing, together with the apparent ease with which members of the E.P.E.A. can obtain equitable remuneration for isolated members who are performing definite functions within the industry, irrespective of their theoretical qualifications, must cause members of non-technical professional staffs in the electricity supply industry seriously to consider their own position.

So far as I am aware no member of this class has any one body to which appeal can be made for adequate remuneration. The N.A.L.G.O., which to some extent covers municipal undertakings, is more concerned with the wider aspect of the local government officer, and seems unlikely to take up the case of commercial assistants and kindred staff (including all those who carry out the work under a varied assortment of designations) upon the basis of comparison between their work and that of deputy engineers, mains superintendents, etc.

Apart from this, such a movement would inevitably suffer from the unfortunate, but apparently inherent, petty jealousy existing between the various departments of a local authority, more particularly since most N.A.L.G.O. executives are not members of Electricity Departments.

It may be represented that the engineering element in the electricity supply industry is purely ancillary to the main commercial function of supplying electricity and to the social function of providing a vital necessity in organised society. It thus appears somewhat incongruous that members of the class referred to, many of whom, as recent developments have shown, could be entrusted with the work of general or commercial manager, and who are members of Chartered Institutions of much longer standing than the I.E.E., should be so left behind by their technical colleagues in obtaining proper recognition of their standing. Apathy, with the resultant lack of organisation, coupled with the effect of engineering propaganda among municipal councillors, seems to be the reason for this state of affairs, but it would now appear high time that more consideration was given to the matter.

A thorough investigation into the national position of such staffs seems necessary, followed, possibly, by the formation of an association to approach employers regarding the grading of existing personnel, and to draw up an advisory scheme of study to assist in the adequate qualification of future entrants.

I would be pleased to hear the views of other interested persons. There is a possibility that out of the exchange of ideas suggested it may be practicable to form the nucleus of an organisation which will be of considerable benefit to the future commercial development of the industry.

Crewe. P. H. FLATT, B.Sc. (Econ.)

Payment for Technical Posts

HAVING read the letter on chief engineers' salaries by "Unit" and then casually perused your "Situations Vacant" section, I note that the Ministry of Labour (aptly named) offers the princely salary of "£156 per annum up, according to qualifications" to an unfortunate possessor of the Higher National Certificate in Electrical Engineering.

Does the Ministry really imagine, that in times such as these, when prices are rocketing and salaries do not follow, a clever man would prefer a situation of this kind to remaining in the obscurity enjoyed by a factory labourer at £4 per week? Status may or may not be an advantage, but if it is purchased on these terms I dread to inquire the salary of the chief of this Ministry of exploitation experts.

Surely it is time that something was done to prevent years of study reaping such a reward. The present situation in the mining industry will be nothing compared to that which will ultimately arise in the electrical industry if this state of affairs is allowed to continue. No parent would put his son into a profession which offers such a scope as this.

FAIRPLAY.

Automatic Welding

A WELL-ILLUSTRATED 48-page handbook of instructions published by the "Fusarc" Welding Co., Ltd., Letchworth, Herts., describes the principles of operation and applications of automatic plant to speedy and economic fabrication in metal of thickness from one-eighth inch upward. Its makers claim that the output of this equipment equals that of eight to ten manual welders, since the use of a continuous electrode unwound from a spool minimises process interruptions, particularly in long-seam and repetition work. Electrode characteristics and operational data are included in this booklet, which is of convenient pocket size, and is written and illustrated in a practical manner.

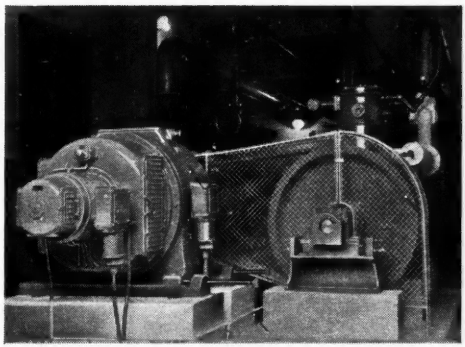
Food Storage

Safeguarding Stocks by Refrigeration

A description of one of the many establishments set up by the Ministry of Food for storing essential supplies

IT has often been said that the war may be won by the side which possesses the last week's supply of food. While it was encouraging to hear from Lord Woolton recently that, despite the bombing of our cities and the restrictions imposed by shipping, the position regarding our supplies of rationed food is as good to-day as it was a year ago, this does not mean that the Ministry of Food now feels that it can relax its efforts to safeguard our stocks of food still further or to build up still greater reserves.

In this direction, however, despite the fact that it now controls the whole of the cold storage premises in the country, the Ministry's activities have been somewhat restricted, so far as concerns perishable foodstuffs at any rate, by the accommodation available. To remedy this many refrigerated storage depots are being erected all over the country in the less vulnerable districts and some of them are already in commission. A few days ago we were privileged to visit one of the latest of these to be completed and to see for ourselves what progress has been made recently in refrigeration practice in connection with this class of work.



One of the compressors at the food storage depot driven by a Crompton Parkinson 120-HP, 1,000-RPM auto-synchronous motor

The whole layout of the building, as well as the plant, is on the most up-to-date lines with special attention to wartime requirements. The main building is of three storeys surmounted by a flat fireproof roof. As a further precaution it has been divided into two self-contained identical halves.

Simple and rapid reception and dispatch of foodstuffs is ensured by the provision of raised loading bays on all four sides. On two of these are railway sidings, connected a few yards away with the main line. Four 40-cwt. Evans lifts, one lift for each quarter of the building, gives access to the store rooms on the first or second floors. These are equipped with Bull "Super Tandem" 15-HP and 2-HP motors to ensure correct landing with full load or no load. The gate locks, brakes and control are DC operated from a metal rectifier mounted on panels. A Gent recall system is also incorporated.

As already mentioned the cold rooms are arranged in two self-contained units of similar design and equipment. Each of these units comprises six rooms, two on each floor, and is provided with its own compressor and cooling rooms. The latter are identical except that the compressor room at one end is equipped with two compressors, one as a standby to serve either half of the building. The two rooms on each floor of each unit though interconnected can be employed separately if desired.

Each of the twelve cold rooms has a capacity of 50,000 cu. ft. giving a total capacity of the whole store amounting to 600,000 cu. ft. Entered by means of air locks, they are insulated throughout by cork slabs (Insulations & Constructions, Ltd.), and are maintained at a constant temperature of 13 to 16 deg. F. by an air circulating system, refrigerated air entering and leaving through adjustable grilles in ducts running across the centre and end of the rooms.

These ducts lead directly to one of the two cooling rooms, which measure 40 ft. long, 30 ft. wide by 14 ft. high, and are situated just below ground floor level. For the circulation of the refrigerated air to the cold stores each of the cooling batteries is fitted with a 48-in. diameter "Davidson" axial-flow fan direct coupled to a 16-HP electric motor running at 950 RPM. Each fan delivers air at the rate of 35,000 cu. ft. per minute against the resistance set up by the ducting system. Adequate provision of shut-off and cross-over dampers has been made so

that any one cooler can be operated on any one of the sets of the rooms.

To ensure uniform temperature throughout the cooling room further distribution of air inside the rooms is obtained by a sub-system of duct work, the refrigerated air entering and leaving through adjustable grilles on the ducts running across the centre and ends of the rooms. Efficient absorption of heat from the air is ensured by the continuous circulation of brine over the cooling coils and for this purpose Pulsometer pumps in duplicate are employed. These are driven by 4-HP, 1,430-RPM Crompton Parkinson motors and are equipped with Allen West starters and Berry's "Viking" metal-clad switchgear.

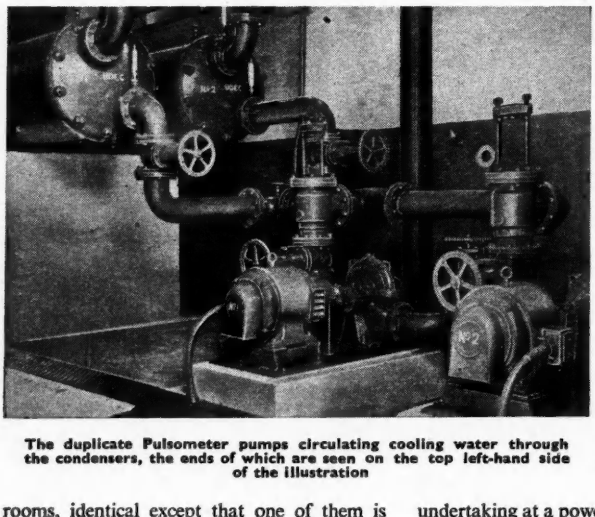
Liquid ammonia is circulated through the evaporator coils from a storage tank or accumulator situated in the basement by a Worthington-Simpson pump driven by 1-HP, 1,435-RPM Crompton Parkinson motors also equipped with Allen West starters and Berry's switchgear. The liquid ammonia after passing through the evaporator coils returns to the accumulator for re-circulation, but the gas given off by the evaporation of the liquid is collected at the top of the accumulator which is designed to ensure that it passes to the compressors in a dry state. It is then passed by the compressors on to the water-cooled condenser where it is liquefied and returns once again through automatic float control to the accumulator.

As already stated, there are two compressor rooms, identical except that one of them is equipped with two compressors (one of them spare), while the other has only one, though provision is made for the addition of a further unit if it ever becomes necessary. Each compressor, which is of the high-speed vertical totally-enclosed type with a refrigerating capacity of 60/65 tons, is sufficient to deal comfortably with one half of the store and is driven through vee-belts by a 120-HP, 1,000-RPM Crompton Parkinson auto-synchronous motor of the protected type.

For starting the 120-HP compressor motors Allen West oil circuit-breakers with a maximum continuous rating of 200 A are used in conjunction with Erskine Heap liquid starters, the exciter on the motor shaft supplying a field current to produce a power factor of 0.85 lagging at full load. There are Allen West emergency stop buttons mounted on both compressor and motors.

The condensers are of the horizontal shell and tube type. Water from cooling towers (Premier Coolers) outside the building is circulated through a series of tubes inside the cylindrical shell at the rate of 15,000 gallons an hour by means of Pulsometer pumps in duplicate driven by 8-HP, 1,430-RPM Crompton Parkinson motors.

The refrigeration process is made entirely automatic by means of high-pressure float valve control. To keep a watch on the temperatures throughout the process, two 20-position Negretti and Zambra remote resistance thermometers enable the engineers on duty in the compressor rooms to see at a glance the temperatures at thirty-two positions in the cool rooms and at eight positions in the brine system. These instruments have 10-in. scales and are mounted in moisture and fume-proof cases.



The duplicate Pulsometer pumps circulating cooling water through the condensers, the ends of which are seen on the top left-hand side of the illustration

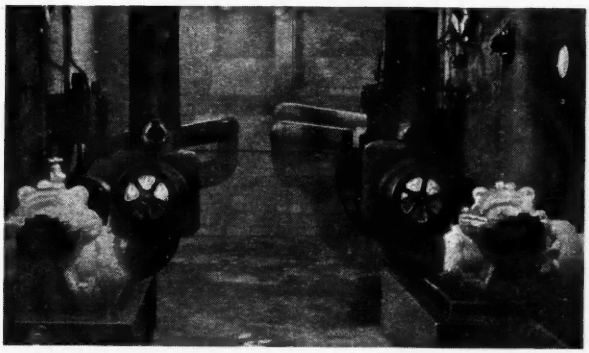
The installation of this temperature indicating system with its alternative indicating positions presented the electrical contractors with a complicated wiring problem and they are to be congratulated on their achievement in completing the job in only ten days by the employment of multi-core cables carried to convenient positions.

About 600 kW is the maximum power demand of the stores and to supply this a 400-V three-phase, 50-cycle AC supply is taken from the local supply undertaking at a power house close by through an E.C.C. oil circuit-breaker. From the power house cables in parallel connect up with the main switchboards in annexes to the com-

pressor rooms. The switchboards, supplied by Allen West & Co., Ltd., are of a neat metal-clad design comprising five panels for lighting, power (two) and the two compressors.

For the main distribution Siemens cable has been used in conjunction with Berry's "Viking" switchgear and Wm. Sanders local fuse boards. The wiring has been carried out on the "Glo-Clad" system throughout, utilising lead-covered cables with no conduits. The running of the cables between the various floors is simplified by the availability of large ducts which can also in an emergency serve as fire escapes. Wardle bulkhead lighting fittings are employed extensively for the lighting, with "Ediswan" reflectors on the loading bays. An air-raid warning system has been installed using Gent bells to give audible warning at twelve points throughout the building, controlled from two points on the roof using Crabtree contactors for this purpose. The whole installation has been neatly carried out by the contractors with great promptitude.

The complete store was erected to the design and under the supervision of Mr. T. Laurie Price, the contract for the electrical work being placed with John Adams, Ltd., of Manchester, whilst the entire contract for the refrigerating plant and its attendant gear was given to the U.D. Engineering Co., Ltd., of Park Royal, London.



The brine pumps in the cooling room

Restrictions in Shanghai

STRONG measures to restrict electricity consumption in the International Settlement have been introduced by the Shanghai Power Co. The president of the company announced that all consumers whose normal consumption is 1,000 kWh per month would have to pay six times the tariff if they exceeded this figure. The previous decision to treble the charge had apparently not proved satisfactory. Coal stocks were dwindling at the rate of 22,700 tons per month and reserves were gradually being depleted. The increased charges would enable the company to buy high-priced coal for reserves.

The president admitted that the system was an unfair one and that factories whose products demanded a great deal of power would be at a great disadvantage. He said that a different method would be worked out, but they could not wait and had been compelled to introduce this arrangement for the time being. The company agreed to allow the use of neon signs as to stop them would be unfair to the sign industry. As to the minimum charge, the company admitted that 8 per cent. of Shanghai's electricity consumers could not afford the minimum charge of $1.45, which was equal to burning a 40-W lamp for three hours every day, and it was suggested that these consumers should stop using electricity altogether.

In the French Concession the situation is similar. It was recently announced that the surcharges already in force would be raised. The lighting surcharge will go up from 103 to 125 per cent. Considering that it was previously raised from 97 to 103 per cent. the increase is not an inconsiderable one. The surcharge for power which stood at 140 per cent. is to be increased to 190 per cent. It was previously 97 per cent. Electricity for cooking and heating will carry a surcharge of 190 per cent. (raised from 140 per cent.). Charges in the French Concession are still the lowest in Shanghai, however.

Tin Production

WORLD production of tin in June, 1941, is estimated at 27,700 long tons, compared with 22,900 tons in May. Production for the first six months was 125,700 tons in 1941 against 105,200 tons in 1940.

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Plans for Reorganisation

Need for Immediate Action

By J. J. Lesser

THE present organisation of the electricity supply industry was the subject of close examination by the McGowan Committee in 1936 and responsible opinion now agrees that far-reaching proposals for reorganisation will be made by the Government as soon as possible after the war. The problem is a big one and will require not only the highest degree of technical skill but also—and this is no less necessary—a wide knowledge of the social and industrial needs of this country. Never let it be forgotten that the goal is not mere reorganisation, but the removal of certain existing anomalies and making available a "cheap and abundant supply."

The destruction wrought by the war will speedily be made good and provide an additional urgency to the solution of the problem of improving the organisation of the electricity supply industry. At the first National Electrical Convention in1935 men of much knowledge and experience in the industry gave utterance to many words of wisdom and hope. It may be well to recall the following from the speech of Sir Archibald Page:—

> "Although the presence of the grid and the substantial background of developed territory has already enabled the industry to look forward to speedier expansion in the future, it would be idle to contend that all obstacles to low cost distribution have been removed. In particular it will be definitely necessary for the industry itself—and you will note that I accentuate this—to consider individually and collectively and with great care this question of distribution areas, not making size the only criterion, but having regard also to what I would call a proper balancing of the territory and keeping well in mind that in some instances a lower average price can be arrived at almost immediately by amalgamation under enlightened management of some of the undertakings."

If the electrical industry is to secure its proper place in the post-war world the necessary plans for reorganisation and improvement must be made now

One cannot adequately deal here with many of the items that will necessarily call for close investigation, but in view of the setting up of the Ministry of Works and Buildings under the able direction of Lord Reith, certain observations may be offered in the hope that they will be of some assistance.

Occupiers of commercial and residential buildings have from time to time complained of the high cost of installation work. This is not the fault of the contractor, who necessarily bases his quotation upon the cost of materials and labour, plus a reasonable addition for overheads and profit. It is more often due, either to the absence of adequate service capacity provided by the supply undertaking or to the inadequate vertical mains provided by the owners within the building. Hitherto, the practice has been to provide facilities for very little more than bare lighting necessities, so that when occupiers of premises become attracted by the use of electricity for other purposes, they are called upon to bear additional costs resulting from either the parsimony or the shortsightedness of others.

It must also be remembered that front gardens are private property and supply undertakings are not obliged to carry service mains free of charge over private property. Let me illustrate some results of this by the following two cases which have actually occurred:—

(*a*) X bought a house in which the previous owner used electricity for lighting only. The new owner wished to use electricity for warming, cooking and water heating. The service cable that had been provided by the supply undertaking could accommodate only 2kW. The supply undertaking demanded a payment for increasing the capacity of the service. Until X agreed to pay, the supply undertaking seemed indifferent as to whether it secured the additional load or not.

(*b*) Y bought a house and used electricity for lighting only. After being in occupation for about ten years, he decided to abandon gas for heating and to install a modern system of electric warming. The supply undertaking restricted him to the use of 6 kW (which was inadequate for the purpose), as Y would not pay any additional charges for increasing the service capacity.

These examples serve to show how a supply undertaking's development policy may to some extent be negatived through the inadequacy of its service cables. A small additional cost at the outset would not have materially increased the capital charges, but would have secured benefits to consumer and undertaking alike. Many are the cases where, owing to the inadequacy of the vertical distributors, consumers in commercial buildings have been denied the benefits of the use of electricity for purposes other than lighting with a

consequent loss of business to the undertaking. The lesson to be learned from this is that in the new buildings to be erected after the war, suitable and proper rising mains must be provided to accommodate a load far in excess of the estimated requirements for merely lighting purposes. It is essentially a matter which should be financed by the owners of the buildings concerned, as it is in their interest to attract tenants by offering the utmost facilities for the enjoyment of their premises. In this instance, if the supply undertakings were called upon to contribute to the cost of providing these mains, the resultant increase in their capital expenditure would delay a reduction in tariffs.

Accommodation of Equipment

Another matter which calls for serious attention is the tendency on the part of architects to overlook the amount of space required in commercial buildings for the housing of the supply undertakings' equipment. All too often after plans have been drawn and approval granted by local authorities it has been found that the most meagre allocation of space has been made for the housing of such equipment, and much difficult negotiation has been necessary to secure the proper accommodation.

It is not generally realised that in densely built-up areas such as the City and West End of London there is much congestion of mains of various kinds beneath the roadways, and furthermore, that the efficient distribution of electricity now demands the installation of transformer equipment in the larger buildings, for which a suitable chamber must be provided. A little foresight is all that is required to secure the willing and most cordial co-operation of the supply undertaking concerned.

There has been a notable tendency among many in the supply industry to view development almost solely from the standpoint of domestic electrification. No one will be so foolish as to deny the importance of providing a "cheap and abundant supply" to the millions of homes in the towns and country, but, as Mr. J. C. Dalton said at the National Convention:—

> "I trust we shall not be lulled into the belief that the domestic load is the be-all and end-all of our future activities. The commodity which we have to sell is a very versatile one. . . . The supply for power purposes to-day greatly exceeds that for all other purposes and the development of the industrial load has not only a national aspect, but it is very vital to the future of our industry."

The profound truth of this statement is no less valid to-day.

The Factories (Standards of Lighting) Regulations, 1941, which require the provision of adequate illumination in certain factories, will most certainly be more strictly enforced after the war, and one may be sure that the lamp manufacturers with their restless research workers will not be slow to rendering assistance by the introduction of new types of lamps giving still more lumens per watt capacity.

It is to be hoped that more electrical contractors will realise that something in addition to mere ability to erect a wiring installation will be required of them in the future. Customers of necessity rely upon the knowledge and the skill of the contractors to prepare schemes for lighting which incorporate the most up-to-date equipment and scientific layout. E.L.M.A. has in the past done some fine work in giving lectures and demonstrations for the benefit of those in the industry who may be called upon to deal with this branch of the business, and it is suggested that after the war the Electrical Contractors' Association might also take a hand in this work and collaborate with E.L.M.A. to extend these facilities throughout the country.

Electricity is now generally adopted for motive power in newly erected factories, though it must be admitted that directly applied mechanical power still obtains in many of the older establishments in various parts of the country. For example, among the trades which used the largest quantities of coal in the year 1935 (the time of the last Census of Production) the textile industry used 7.24 million tons as against 11.798 million tons used by electricity undertakings.

Unlike the iron and steel industries, which use large quantities of coal for heating processes, it is a fair assumption that by far the greater part of the coal used by the textile industry is either for driving steam engines or for the generation of electricity. In the same year the textile trades, using 61 per cent. of the coal used by electricity undertakings, generated 569.9 million kWh for private use, whilst electricity supply undertakings generated 17,569 million kWh. These figures indicate that most of the coal taken by the textile industries must have been used for directly applied mechanical power through the medium of steam engines. There is here a large field available for the extension of public generation.

Post-war Building

During the period of the last war—as indeed during the present war—private building operations were at a standstill and the accumulated arrears resulted in intense activity in the construction of new buildings between the years 1920 and 1930. Many of the large banking, shipping and insurance institutions re-built their head offices and a large number of ne commercial buildings were erected.

At the outset the electricity supply industry, and others concerned with the manufacture of appliances, were not ready to make a bid for the space-heating of these new buildings. It therefore became standard practice among architects and others to install central warming systems operating from fuel-fired boilers, and to leave the owners or occupants to make

supplementary arrangements for electric heating to remedy the defects in the efficiency of these fuel-fired systems.

One result was that electricity supply undertakings found themselves called upon to accept the worst possible loads, as the electric heating in these cases was mainly required during very cold weather when many undertakings were already experiencing their peak demands. The load factors of such installations were in the neighbourhood of 2 per cent. Some undertakings checked this unhealthy development by imposing kilowatt charges in accordance with the provisions of Section 23 of the 1922 Act. A more constructive policy was, however, made possible by the appearance of new and comprehensive electric heating systems designed to supply the needs of most large buildings. Many supply undertakings were quick to grasp the opportunities afforded by these new heating systems to improve their station load factors and co-operated by offering terms which, in some instances, were little more than bare cost.

Thermal Storage

Much progress was, therefore, made with the various electric thermal storage and other systems so much in evidence up to the outbreak of war. The reluctance in this country to adopt new ideas and systems is notorious and the electricity supply industry has had to fight every inch of the way for a share of the space-heating business. Much knowledge and useful experience have been gained by undertakings and manufacturers and both will immediately be ready to co-operate with a view to the installation of modern electric warming in the many new buildings that will be erected.

Here then is another large field of development for electricity supply undertakings, and the industry together with the manufacturers and installation contractors should lose no time in ensuring that its claims to participate in the space-heating business are properly satisfied. If no attention is given to this subject until the war ends, much of the hard work done in past years will have to be done all over again, while our competitors will have gained a long start.

There is much evidence of the appreciation of manufacturers and others of the advantages of the use of electricity for industrial heating processes. The great newspaper industry, for example, is already convinced and is steadily extending its use of electricity for type-metal melting wherever a suitable tariff can be arranged.

Recently a supply undertaking and a manufacturer co-operated to demonstrate to a jobbing printer the advantages of electrically-heated metal-melting pots, the undertaking providing the temporary wiring and the manufacturer the experimental pot. The test was conducted over a period of four weeks and careful records of performance were kept. In the result the efficiency of the pot was proved and a competitive tariff was framed and found acceptable to both undertaking and consumer, whilst the manufacturer obtained a definite order for, and installed a metal pot with the slight adjustments found necessary during the demonstration. Upon the outbreak of the war there were in Great Britain a total of 7,500 printers, but very few were making the maximum possible use of electricity for heating.

The British Electrical Development Association, through its Industrial Heating Committee, has issued some admirable booklets demonstrating the advantages of the use of electricity for tar heating, steam raising, the treatment of non-ferrous metals, vitreous enamelling, swimming baths and pools, and also low-temperature oven work. Some progress was being made in all these directions and it is obvious that in industrial heating alone there are many opportunities for supply undertakings who are enterprising enough to go out for the business.

It was not the purpose of these notes to make any special reference to further development in domestic electrification, as the opportunities in this field are very well known. Large numbers of women are engaged in munition making, in civil defence and in the three branches of the armed forces. They are having first-hand experience of mechanical and electrical devices and it is likely that they will be inclined to think in terms of electrical methods of working when normal conditions return. A new generation of housewives will be coming along and demanding electrical appliances, if only for labour-saving and hygienic reasons. Local councils and builders should, indeed must, provide the necessary facilities.

Nor has any special reference been made to the thorny question of tariffs, as this involves a wide and careful analysis of local conditions. One question might, however, be submitted for consideration by those affected, *viz.*, how far, if at all, has the grid tariff handicapped development? The experience of various undertakings on this question would be extremely valuable.

A Representative Committee

I have already urged in this journal that the Ministry of Transport should set up a committee composed of representatives of all the parties interested in electricity supply development to work, in collaboration with Lord Reith's Ministry, upon matters concerned with post-war problems. The electricity supply industry will be required to make an important contribution towards post-war reconstruction, and the swiftness and extent of that contribution will depend upon what is thought out and planned now, before the war ends.

Personal exchange of views and investigations by representative men of experience are essential preliminaries to sound creative planning, and I trust that leaders from the interests concerned will use their influence to bring the proposed committee into being.

Considerable saving of fuel in stand-by boilers can be made if attention is paid to the points detailed by the author, who is with the Bury Corporation undertaking

Boiler No-Load Losses

How they Affect Coal Consumption

By V. Walker,
A.M.I.E.E.

NO-LOAD losses of boilers, which include fuel used for banking fires, bringing cold boilers into service, keeping boilers ready for emergency conditions and bringing units into operation and up to normal working efficiency have a considerable influence on boiler house efficiency.

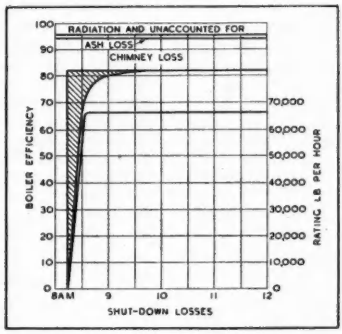
On banking a stoker-fired unit, the effective area of the grate must be reduced as far as practicable, the fires being burnt back and run clear of the coal regulating door, the boiler damper being closed as far as possible, the coal regulating door lowered, and any spaces in front of the door filled in with coal or riddlings. The small fire thus maintained will give the heat necessary to compensate for losses due to radiation. The boiler should then stand for four or five hours without further attention to the fires, the pressure slowly falling to probably two-thirds of the normal in ten to twelve hours, a short run on the stokers being necessary to raise the pressure required. The boiler stop valve should be closed even if isolating valves are fitted, as a leaking isolating valve maintains the pressure in the boiler equal to that of the range and is misleading.

The major portion of the losses during the banked period are due to the cooling of the boilers and brickwork, the radiation being small compared with the interior losses. Depending mainly on the tightness of the stoker and boiler dampers, cold air is drawn through the grates, absorbing heat from the brickwork and boiler surfaces which is discharged through the chimney. The boiler continues to produce steam and maintain the pressure as the brickwork cools and this recovery of heat forms a large proportion of that required to bring the boiler up to normal pressure and efficiency when put into service again.

Coal required for banking and lighting up to provide reserve capacity may vary between 1 and 6 per cent. of the total consumption. The amount used per hour to maintain a boiler in a stand-by condition at three-quarters normal working pressure varies over a wide range, and it is almost impossible to fix a hard and fast rule owing to the many factors involved, such as radiation loss, water capacity and general condition of the plant. Taking an average power-station boiler capable of evaporating 60,000 to 100,000 lb. per hr., with a drum capacity of between 4,000 and 6,000 gal. the no-load consumption may vary between 7 and 4 per cent. of the coal used for full load, amounting to between 80 and 300 lb. per hr. A rough rule is to allow 28 lb. of coal per 10,000 lb. evaporative capacity, which would mean 168 lb. per hour for a 60,000 lb. boiler.

Such items as leaking stop valves, drains, blow-down valves, will affect the losses; other important details are the condition of the arch boiler baffles the tightness of the boiler casings, as well as the cleanliness of the boiler surfaces.

The modern stoker has the advantage that any access of air at the back of the grate can be completely shut off, but the ashpit doors must also be kept tight. It is advisable not to bank boilers if the remainder in service have to increase their output beyond their economical rating, as the losses will be increased by the higher exit-gas temperatures. A more economical plan in some cases is to run the reserve boilers continually at reduced rating, the fires being in a "live banked" state. This method was found very successful in a case where the stokers were of the retort type. The fuel-bed contour covered the major portion of the grate, and ash was allowed to accumulate to cover the parts not covered with fuel. This maintained the fuel bed in excellent condition for a sudden increase



Typical shut-down losses of stoker-fired boiler

in load. The rating of the boiler was adjusted so that the steam temperature was not reduced to any great extent, a load of between 25 and 30 per cent. being found suitable, and the stokers were run for a given period within the hour, the damper being nearly closed.

If the banked-fire losses of the boilers are comparatively high, it may be more economical to let the fires go out if the unit is not required for a period of over twelve hours. This can be ascertained by taking a test, the amount of coal for banking over a given period being compared with the amount necessary to light up and bring the boiler into service. Account must be taken of brickwork deterioration, which is likely to take place if the furnace is being continually cooled down. Brickwork should be heated and cooled slowly, especially at temperatures under 800 deg. C., as most of the expansion occurs below this figure.

Apart from the loss due to banked fires, a considerable loss is incurred in bringing boilers up to full load and normal efficiency and letting them back to the banked-fire condition. These losses are ascertained by first taking measurements to compute the boiler efficiency at economical rating over, say, a period of six to eight hours. The coal should then be cut off, the stokers and fans shut down and the load reduced to zero. The boiler damper is also closed as far as possible, and the stop valve shut, the fires being allowed to burn off the grates.

Time-Efficiency Curve

After a period of, say, fifteen hours, the fires are lighted and the boiler brought up as quickly as possible to the conditions of working prior to shutting down, *i.e.* its economical rating. The test is then continued for a further three or four hours, so that the boiler efficiency can be computed at close intervals. From the figures obtained a curve is constructed showing the time taken to attain normal efficiency. The first efficiency point on the lower portion of the curve reproduced includes all the steam evaporated and coal used from shutting down, so that any reclaimed heat from the boiler furnace brickwork is taken into account. A small quantity of steam will be evaporated before the stop valve is closed, and care should be taken that no blowing off occurs.

The normal efficiency of the boiler in the example was 82 per cent., and the curve shows that a little under two hours was required to bring the boiler up to this efficiency after shutting down. The shaded portion of the curve represents the shut-down loss, and was equal to twenty-three efficiency hours. As the average normal rate of firing was 9,000 lb. per hr., this corresponds to $\frac{23}{82} \times 9000 = 2{,}500$ lb. of coal, which is equal to 168 lb. per hr. over the shut-down period of fifteen hours and slightly more than the banked-fire loss for these boilers. The unit for which the curve was prepared had a capacity of 80,000 lb. per hr., with steam conditions of 325 lb. per sq. in. and 700 deg. F.

Modern stoker-fired plant is remarkably flexible in operation, and normal pressure can be raised from banked conditions and three-quarters pressure to maximum output within 14–18 minutes from commencing operations. A stoker-fired plant with auxiliary oil burners can attain this result within eight minutes. Very rapid starting is not, however, recommended except in emergency especially with high pressures and temperatures and the correspondingly greater thickness of pressure parts, including drums.

The starting cycle should be closely watched, so that the superheater tube temperatures do not exceed a predetermined value consistent with safe metal temperatures. Temperature differentials between tubes and headers should be guarded against, as this may result in leakage at expanded joints.

Economiser Conditions

Steam in the economiser section is also to be avoided during banked and starting periods. If the economiser is not provided with a by-pass gas passage, the water in the economiser may be quickly changed into superheated steam, due to lack of circulation. Violent cooling will take place on opening the check valves, resulting in distortion and leakage.

Corrosion and fouling of the air-heater elements is often considerably increased in banked boilers. There is a dew-point corrosion limit, as with economisers, which depends on the sulphur and moisture content of the coal. During the banked period, the temperature of the gases entering the air heater may be well below this limit. If a by-pass is provided, the air is wholly or in part by-passed around the heater, and a sufficiently high gas temperature may be attained to prevent corrosion.

Metal temperatures of various parts of the boiler heating surfaces, taken by the aid of thermo-couples, can be of great assistance in establishing a rate of firing that will hold temperatures within safe limits and help to reduce unnecessary maintenance.

Lighthouse Beams

STANDARD formulæ for calculating the intensities of lighthouse beams (B.S.942) should eliminate most of the extremely controversial factors that have hitherto prevented international agreement. The inconclusiveness of successive conferences on sea marks has resulted from the use of differing formulæ in various countries for computing intensity, so rendering the values published in "Light Lists" of little real significance. Such comment as has been obtainable from abroad since the outbreak of war has been entirely favourable to the new formulæ, copies of which are obtainable from the British Standards Institution, 28, Victoria Street, S.W.1, price 3s. 9d. each post free.

The Maintenance Man

His Duties and Qualifications

By G. E. Chalk

TIME has marched on since the maintenance man daily trimmed his arc lamps and the copper-gauze brushes of his machines. Voltages have increased, frequencies have been standardised and the power-factor bogey has been largely overcome. Much of the rapid advance of electricity has been due to the patience and skill of the maintenance man. Although the old conception of daily maintenance (and all that it meant) has gone, the age of automatic machinery is here and the future may bring greater complications. Will the maintenance man of the future be found equal to his job? Thirty years' experience has taught me that he will always be required, since almost everything made by man requires some attention during its life.

It is indeed regrettable that the maintenance man of to-day appears to be regarded by the community as a handy man of some sort who can be called upon to patch up anything. There is, I admit, some justification for this, as unfortunately there are far too many unskilled men of this type, and I have often experienced a cold shudder at jobs I have seen. Some of these could even be described as criminal, *e.g.*, safety devices left shorted out, earth connections removed, polarity reversed to put a fault on the dead side and protective guards left off.

The author shows that maintenance is not anybody's job as is sometimes thought; a great deal of training and experience is called for

Radio sets usually surpass everything else in this and it is little to be wondered at that sets over four years old have no commercial value (according to the N.A.R.R.). How much amateur radio is responsible for the infiltration of these men into the trade I do not know, but I strongly suspect that this has something to do with it.

Comprehensive Knowledge Needed

In recent years much has been done to eliminate shoddy work by means of visiting inspectors, and it can certainly be said that the day of the amateur is fast disappearing. Therefore the problem of the efficiency and education of the maintenance man has to be tackled now.

The average maintenance man of to-day is expected to have a working knowledge of AC and DC generators, transformers, rectifiers, motors, starting gear, automatic relay systems, photo-electric cells, time switches, radio, telephones, electrical equipment of cars and various lighting and heating systems. The range in capacity of the apparatus dealt with extends from mere fractions of a watt to several thousands of kilowatts.

Obviously to locate, repair, and prevent faults on these machines calls for a highly skilled craftsman, who should have received his practical training at an electrical manufacturer's works. A regular apprenticeship is always desirable but not essential, provided the student has an ingenious and alert mind (Edison was not apprenticed, but no one doubts his ingenuity).

The apprentice will naturally be afforded better opportunities to gain experience in the various shops than the ordinary employee, but much experience can be acquired through being engaged in modern methods of production. A man who has assembled a hundred electric motors and made the kindred parts should know something about them; otherwise rejections by the test room will compel him to acquire knowledge of the subject as well as to pay attention to detail.

He should possess an almost instinctive knowledge of various metals and alloys, where and how they are employed in the electrical industry, of methods of insulating and the various materials used, of practice in working with machine tools, care of machinery, electrical deposition, the art of winding and the use of testing instruments. He should endeavour to pass through as many shops within the works as possible.

Electricity has become so interlaced with engineering that it has become almost impossible to adhere to rigid lines of demarcation. It is therefore essential that he should make a close study of such matters as the different types of engines used for driving generators and refrigerators. Without this knowledge it may be difficult to discover whether the fault be electrical or not, the efficiency of the one machine being so dependent upon the other.

Special Courses at Institutes

Technical institutes should offer special courses to students who contemplate taking up electrical maintenance work. Much more time should be taken over the simpler subjects, magnetism, the magneto, dynamo and transformer construction, and every effort should be made to make experiments as interesting as possible. Students with a practical turn of

mind so often complain of being blinded by a lot of science that they will never require. Such subjects as inductance and capacity reactance, corona and skin effect can be left to the more advanced student.

It is surprising how many electricians cannot draw the circuit of an induction coil or a magneto, or state whether the secondary circuit is AC or DC (they may have known once but have forgotten). It is very doubtful whether these things were sufficiently drummed into them and it is little to be wondered at that hit-or-miss methods are adopted by them in later life with types of machines which involve multiple circuits.

Appointment by Merit

In his supervisory and routine duties the maintenance man, in the majority of cases, operates with his own skill and initiative alone, except in the case of large buildings, works, mills and factories, where he often finds himself under the supervision of a resident engineer or works manager, with a number of branch or shift supervisors. This has its advantages as well as disadvantages. Too often this position is coveted by those desiring a soft job and is awarded as a result of influence, the holder allowing himself to be carried by his men. I cannot over-emphasise the importance of such supervisory positions being awarded by merit alone, as experience has proved to me that the majority of them are far from soft jobs and bring with them a considerable amount of worry.

The problems of other departments necessitate close collaboration and take up much of a supervisor's time. His advice and instruction is expected, particularly in regard to the installation of new plant. Obviously also it is to the maintenance supervisor that the company director, works manager and maintenance staff should look for the prevention of accidents and breakdowns and the introduction of new ideas and modern methods. He should be a qualified man of experience possessing patience and discretion, inspiring confidence and alive to his responsibilities, knowing exactly what can be expected of his men.

Exercise of Authority

He should be given unfettered authority to prevent tampering with electrical apparatus by unauthorised persons, and should be enabled to stop anyone from using a portable tool or machine that is inefficiently earthed and to order any faulty machine to be taken out of service irrespective of the authority of any departmental manager.

The maintenance field has become so large and circumstances are so varied that details of routine duties cannot be given here, except to point out that the maintenance supervisor should periodically subject his plant to test, and should be allowed the necessary staff to carry out this work. He should keep a log of breakdowns and test sheets in order to reveal any weak points and show whether a machine is obsolete.

I consider that the best method of organising maintenance is to sectionalise the work, making each man responsible for his own section. In a large building or factory the supervisor should change the sections from time to time in order to prevent laxity, because routine maintenance work can become very monotonous.

He should keep himself posted with the more recent developments and his ability to do so will demonstrate to industrialists and other workers that the modern electrical maintenance engineer does really know his job and deserves adequate recognition of his status.

Qualifying Certificates

A trade certificate qualifying him for maintenance work should be given, classifying him as an electrical maintenance engineer, and this should be demanded by the employer, as so many people these days lay claim without justification to being electricians. This would obviate the growing tendency amongst employers to engage wiremen for maintenance duties. The ability of a man to carry out a good installation is no proof that he is of a mechanical turn of mind or understands the rudiments of electricity.

Disappointment is often expressed by employers at the limited knowledge of their maintenance men, and they invariably blame the trade union for allowing him a full-benefit ticket rather than their own inability to select the right class of man. The trade union caters for all classes of workers, and if an employer likes to engage a man out of another class to do his maintenance work just because the man holds a trade-union ticket, then he asks for all he gets.

Training Engineering Workers

THE second of the "Engineering Bulletins" issued by the Ministry of Labour and National Service deals with training, up-grading and expansion of production. An article on training for toolroom work at a technical college deals with the selection of men for the positions of toolmaker and toolroom operative and the careful combination of practical and theoretical instruction. The illustrations show various stages in training and examples of tools and gauges produced at the college.

Other articles cover the subjects of dilution in shipyards, and the activities of women in engineering establishments (including an account of the half-day shift system instituted by Standard Telephones & Cables, Ltd.).

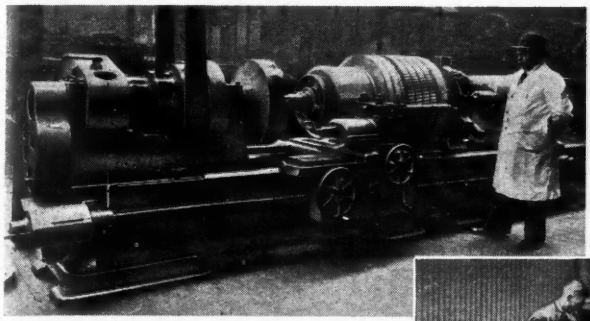
A picture in the bulletin shows a number of women making electrical adjustments in relays, work which involves such fine limits as one gramme pressure on springs and contact clearances of .002 to .003 in. At the farther end women are seen assembling relays after very brief instruction in the work.

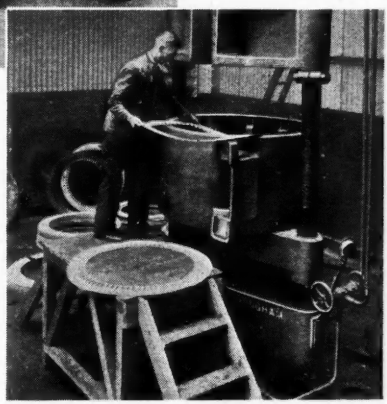
Large Motor Design

Extension of Higgs Range

AN extension up to 600 HP in size in the range of machines manufactured by Higgs Motors, Ltd., has permitted the addition of alternators as well as larger motors, the latter now including the auto-synchronous type, squirrel cage designs with small starting currents, slip-ring induction machines and polyphase AC motors with commutators for speed variation.

Each machine is complete with two end brackets that carry the bearings, which are of the roller type at the driving end. The whole





A view of the armature of a 480-HP commutator motor and (right) assembly of stator plates at the works of Higgs Motors, Ltd.

of the windings and interior are protected by screens over all openings; drip-proof and pipe-ventilated enclosures are also available. The standardised stud-type terminal boxes are interchangeable and will accommodate various sorts of cable.

Induction Regulation

The larger variable speed AC commutator motor is an extension of the type which has been made in smaller sizes for the past three years for drives ranging from draw benches to laundry calenders and paper making reelers to centrifugal casting tables. Its essentials are an induction stator with a wound rotor brought out to a commutator. A separate induction (rotor) regulator varies the input voltage without phase shift before injecting it into the rotor (motor) circuit, thus imparting a shunt characteristic which minimises change of speed with load alteration for a given regulator setting.

An extra winding is added in parallel with the armature winding, but so arranged that corresponding main and auxiliary coils (which are connected together) differ in pitch and do not lie in the same slots, so providing a discharge path for the commutated energy and serving also to reduce the reactance of the coil undergoing commutation. The brush gear is rigidly constructed and occupies a fixed position; since movement is not necessary, brush bedding is not disturbed, which is an important factor in maintenance.

This particular make of AC commutator motor is obtainable in any size up to 480 HP at 1,200 RPM with speed ranges of ten-to-one, or greater in certain cases; such speed variation is against constant torque, providing a HP which varies in proportion to the speed. With larger speed variations a self-contained fan would afford insufficient cooling air at low speeds and absorb too much driving power at high speeds. Instead a small motor-driven blower is incorporated for ventilation purposes.

The associated induction regulator is very similar to a wound rotor induction motor. Two units are mounted together vertically one above the other, the base housing a small motor-driven fan that blows cooling air through the windings and cores. Such forced ventilation tends to keep down the weight and cost of the regulator, which is actuated by a

hand wheel, worm driving the rotor shaft; alternatively a small pilot motor may be geared down to the shaft, permitting completely automatic control by means of a contactor panel with cam-operated limit switches to avoid the over travelling of the regulator in either direction.

Additional limit switches actuated by adjustable cams can be utilised for maintaining pre-set speeds. These regulators compare favourably in price with auto-transformers; their impedance is low and their input and output voltages need not be the same; for example a group of 500-V motors can be run off 400 V-mains.

Squirrel-cage Features

Slip-ring motors may not always be chosen for their greater starting torques, but sometimes utilised merely to restrict starting current, in which respects the Higgs squirrel-cage machines are said to exert 80 per cent. of their full load torque with about 1.8 times full load current, their starting torque being maintained throughout the accelerating period.

The standard stator is of usual construction, but the rotor is special in having three rows of slots. The upper row contains a squirrel-cage winding of bars brought out to two end rings in the usual manner. The slots in the second and third rows are alternate, a shallow slot in the second row being followed by a deep slot in the third row, then by a shallow slot, and so on. These slots contain bars bent in a V shape. One limb of a V piece is inserted in a shallow slot and its other limb introduced into a deep slot, the two free ends of this single-turn coil being then brazed on to a common end ring at one side only of the rotor.

Thus this lower winding (which is situated beneath the squirrel-cage winding) is of a definite pitch, the suitable selection of which prevents objectionable harmonics that would otherwise depress the speed-torque curve, so avoiding any tendency to crawl.

This construction is preferred to other forms of double squirrel cage, or high reactance type of rotor. It increases the overload capacity while power factor and efficiency generally almost equal those of an ordinary squirrel cage machine, being therefore greater than those of a corresponding slip-ring design, in addition to the superior mechanical robustness and lower cost of both the motor and its simplified starting gear.

Even large machines can be switched direct-on if need be, their starting current approximating to 3.5 times the full load requirement with a starting torque about twice that exerted at full load.

All these machines conform to BSS.168, while standardisation and liberal use of jigs and gauges ensure the interchangeability of similar parts.

Factory and Warehouse Control

Provisions of New Order

TO facilitate provision of factory and storage accommodation urgently required for Government purposes, the Board of Trade has made the Location of Industry (Restriction) Order (S.R. & O. No. 1100, 1941). This provides that no person may, without a licence issued by the Board, carry on at any factory or warehouse having an area of 3,000 ft. super or more any trade or business not carried on there previously, or carry on at any other premises having an area of 3,000 ft. super or more, whatever their previous use, a business of production or storage.

It is provided that for the purpose of calculating the floor area of any premises any number of premises situated within an area of a quarter of a square mile are to be treated as being parts of the same premises. The use of any premises which prior to July 26th, 1941, were not being used as a factory or warehouse and are required for the carrying on of a trade or business other than that of production or storage is not subject to licence.

The use of premises for a retail establishment (unless they had been previously used as a factory or warehouse) is not subject to licence. This exemption applies even though goods are stored in premises ancillary to the retail establishment on behalf of a wholesaler in connection with any scheme for the dispersal of stocks of goods.

Premises coming within the scope of the Order may be used for storage (without licence) for a maximum period of 28 days but the responsible person must notify the Regional Office of the Control of Factory and Storage Premises within a period of 10 days of their occupation.

Concession to Bombed-out Firms

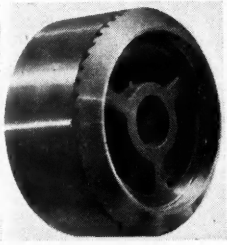
Special consideration will be given to applications for licences from firms whose premises have been destroyed or rendered unusable by enemy action and who wish to acquire alternative premises in their own immediate neighbourhood, provided that the premises are not required for some essential purpose and that the building can be occupied and production carried on without the purchase of new machinery or fittings and without alterations which would require a building licence.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

All-welded Rotors

A NEW all-welded rotor adopted by BROOK MOTORS, LTD., Empress Works, Huddersfield, as the standard unit for its cage motors, has for its electrical circuit a solid cage of pure copper, and combines the advantage of close fitting bars and slots with a mechanically pure joint of electrolytic copper. No other material whatever is used in the weld.



Brook all-welded rotor

The welding process required has been developed by the company's research department. Compared with the brazed rotor the new unit shows marked improvement in electrical performance and it is virtually indestructible.

Mercury Switches and Relays

A series of switches of the mercury element type has recently been produced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. There are five distinct types, namely: light-duty single-pole make-and-break models with loose liners and a carrying capacity range of from 4 to 25A at 250 V; single-pole make-and-break switches (with fuse in liners) rated at from 10 to 30 A at 250 V and 400 V; a single-pole change-over type (break before make) also fused in liner and rated at between 10 to 20 A at 250 V; a series of delay-action switches; and a multi-contact type for the closing of several circuits in succession, but which are switched off practically instantaneously.

All the switches mentioned are suitable for either AC or DC working. The glasswork is annealed and is tested optically by polarised light to ensure freedom from blemishes and internal stresses; the electrodes are electrically cleaned and redistilled mercury is used in conjunction with chemically pure reducing gas (hydrogen) to facilitate prompt extinction of the arc.

More details of these switches, together with particulars of two new mercury relays, are given in a leaflet (No. X.9292) recently issued by the company.

Plastic "Coolicon" Shades

Pendant lamp shades of the "Coolicon" type, so ventilated as to keep the lampholder cool, are among the most popular. Since the introduction of the opal variety, the GENERAL ELECTRIC CO., LTD., has put into production a similar design of shade made of plastic material which is white and translucent.

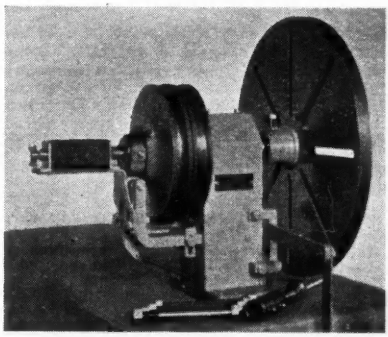
It is of the deep pattern and is made in two sizes. Compared with some previous models, the gallery of the 11-in. model has been modified so that when used in conjunction with a 100-W lamp the angle of cut-off is such as to comply with the relevant British Standard Specification.

Since the 9-in. shade used with a 60-W lamp also complies with those conditions, both models may be used when desired for factory equipment, providing good direct illumination below the shade, and the translucence of the material helps considerably to lighten what might otherwise be dark patches of ceiling. The new shade has been so designed that a number will nest easily and neatly to facilitate packing and stocking, and reduce breakages, it is also of pleasant appearance.

Clutch Coil-winder

The latest clutch-actuated and power-driven wire coil winding machine offered by FRANK WHITELEGG, 90, Robinhood Lane, Sutton, Surrey, is generally similar to the SW model, except that it is fitted with a pulley of about 6 in. diameter grooved for a V-belt 0.5 in. wide, which makes the drive more powerful and reduces the winding speed.

It can be used for winding up to about 8 gauge of the usual electrical qualities when driven by a motor of from $\frac{1}{3}$ to $\frac{1}{2}$ HP, running at 1,000 or 1,400 RPM. The 12-in. faceplate illustrated can be replaced by a winding spindle, shown lying in the foreground. An end support for the winding spindle is now available that is provided with a loose revolving end which is pointed to enter the spindle-end dimple, bobbin or former.



Clutch-driven coil and bobbin winder

The simple clutch is "Ferodo" lined and fitted with a band brake pulley; engagement is by pressing a pedal, which operates through a push rod and fork fitted with a thrust ball bearing. When the pedal is released a spring disengages the clutch and, at the same time, the brake is applied by the pull of the pedal spring to bring the winder to rest.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specifications (1*s. each*) *can be obtained from the Patent Office,* 25, *Southampton Buildings, London, W.C.*2.

1939

11233. "Apparatus for reproducing sound from film records." Radio Corporation of America. April 23rd, 1938. (538083.)

24295. "Capacitive follow-up control elements." Contraves Akt.-Ges. February 6th, 1939. (538052.)

27667. "Electro-optical systems for the transmission and reproduction of multi-coloured originals such as coloured photographs." Kodak, Ltd. October 11th, 1938. (538012.)

27668. "Electro-optical reproduction of colour photographs." Kodak, Ltd. November 19th, 1938. (Addition to 488835.) (538013.)

27838. "Safety core insulators." A. O. Austin. October 13th, 1939. (538014.)

29948. "Electron image dissecting arrangements." I. J. P. James. November 13th, 1939. (538054.)

30648. "X-ray apparatus." L. L. de Kramolin. November 25th, 1938. (538015.)

32305. "Means for saving life." General Electric Co., Ltd., and S. W. Richards. December 15th, 1939. (538088.)

1940

538. "Electron multipliers." R. W. Kersey and Vacuum-Science Products, Ltd. January 10th, 1940. (538020.)

612. "Electrical hand torches." G. Subkis. January 11th, 1940. (538090.)

627. "Methods and apparatus for measuring the power factor of an electrical device." A. Reyrolle & Co., Ltd., and E. A. Livingston. January 11th, 1940. (537978.)

749. "Cathode-ray tube devices." Electrical Research Products, Inc. February 8th, 1939. (538021.)

783. "Carrier wave communication systems." Standard Telephones & Cables, Ltd., and B. B. Jacobsen. January 13th, 1940. (537966.)

786. "Control means for electrically heated appliances." Simplex Electric Co., Ltd., P. W. Davis and A. V. Barton. January 13th, 1940. (537983.)

787. "Electrically heated hot plates or boiling plates." Simplex Electric Co., Ltd., P. W. Davis and A. V. Barton. January 13th, 1940. (537984.)

802. "Couplings for shielded electric cables." P. J. Packman, R. W. Rough and Plessey Co., Ltd. January 13th, 1940. (537968.)

889. "Suction cleaners." Hoover, Ltd. January 26th, 1939. (537988.)

967. "Suction cleaners." Hoover, Ltd. February 15th, 1939. (538027.)

1557. "Periodic wave generators, particularly for television." Hazeltine Corporation. February 16th, 1939. (538064.)

1788. "Split-phase relay for alternating current." Landis & Gyr Akt.-Ges. October 5th, 1939. (537992.)

1935. "Navigational devices." Marconi's Wireless Telegraph Co., Ltd. January 31st, 1939. (538030.)

2344. "Pyrometers." H. A. Stevenson. February 7th, 1940. (538066.)

2600. "Electric measuring instrument with suppressed zero." F. L. Steghart. February 10th, 1940. (538031.)

2755. "Air-cooled enclosed dynamo-electric machines." P. R. Mossay and P. A. H. Mossay. February 13th, 1940. (538032.)

3139. "Television receiving apparatus." Hazeltine Corporation. March 15th, 1939. (538103.)

3363. "Underfloor duct electric wiring systems." F. V. Wickham, and E. J. Sutton. February 22nd, 1940. (537996.)

3590. "Electric cables." R. F. D. Milner. February 27th, 1940. (538068.)

3749. "Electric switches, particularly for alternating current." J. H. Tucker & Co., Ltd., and F. C. Fuke. February 29th, 1940. (537998.)

3869. "Measurement of phase change and envelope delay of a transmission line." Standard Telephones & Cables, Ltd. March 3rd, 1939. (538035.)

4163. "Telegraph signalling systems." Teletype Corporation. March 13th, 1939. (538037.)

4529. "Electrical switches, and contacts and terminals therefor." United-Carr Fastener Corporation. March 11th, 1939. (538069.)

4864. "Absorption refrigerating apparatus." Electrolux, Ltd. April 14th, 1939. (537999.)

5023. "Combinations of electric-discharge devices with stray-field transformers adapted to operate them." General Electric Co., Ltd., and J. Cates. March 18th, 1940. (538038.)

5212. "Circuit arrangements for operating h.p., m.v. electric-discharge devices." General Electric Co., Ltd., V. J. Francis and E. Kettlewell. March 20th, 1940. (538039.)

5767. "Microwave devices." Marconi's Wireless Telegraph Co., Ltd. March 31st, 1939. (538040.)

6001. "Magnet holders for electrical measuring appliances." Landis & Gyr Soc. Anon. June 30th, 1939. (538041.)

6145. "Piezo-electric crystals." Automatic Telephone & Electric Co., Ltd., R. A. Spears and P. Kenyon. April 5th, 1940. (538002.)

6791. "Electric-discharge devices required to have a constant starting potential." General Electric Co., Ltd., and B. N. Clack. April 15th, 1940. (Cognate application, 13341/40.) (538072.)

6931. "Air and gas compressors." British Thomson-Houston Co., Ltd. April 19th, 1939. (538044.)

6986. "Automatic circuit-breakers and similar electric switchgear." J. A. Crabtree & Co., Ltd., H. F. McLoughlin and W. E. Hill. April 18th, 1940. (538108.)

6987. "Solenoids." J. A. Crabtree & Co., Ltd., H. F. McLoughlin and W. E. Hill. April 18th, 1940. (538109.)

8213. "Electrical communication systems." Electrical Research Products, Inc. July 8th, 1939. (538006.)

8460. "Electrical communication systems."

General Electric Co., Ltd., E. V. Newbery and E. P. L. Westell. May 10th, 1940. (538111.)

9625. "Regulation of voltage of electricity supply." Standard Telephones & Cables, Ltd. June 7th, 1938. (538077.)

10872. "Arrangements for suppressing internal voltage oscillations in electric circuits." British Thomson-Houston Co., Ltd. (Tokyo Shibaura Denki Kabushiki Kaisha). June 25th, 1940. (538007.)

11047. "Steam generators." Foster Wheeler, Ltd. July 29th, 1939. (538008.)

13553. "Methods of, and apparatus for, assembling electric transformers." British Thomson-Houston Co., Ltd. August 28th, 1939. (538081.)

14297. "Means for the electrical treatment of water" W. M. Still & Sons, Ltd., and E. H. Still. September 17th, 1940. (538113.)

Water-Power in Tasmania

New Plant Ordered from England

OF the 621.7 million kWh generated in Tasmania during the year ended June 30th, 1940, approximately 89 per cent. was produced by the Hydro-electric Commission. The population of the State is roughly 240,000, giving an average of 2,500 kWh generated per head, which is substantially greater than in any other State of the Commonwealth. This the Commission considers to be a measure of the advantages which have accrued to Tasmania from the development of its water-power resources.

The Commission's chief stations are at Waddamana and Tarraleah, and extensions of both are projected. For Waddamana, contracts have been placed for two additional 16,700-HP sets, and two 21,000-HP units are to be installed at Tarraleah. Because of the war it appeared that the new generating plant required would have to be obtained in America, but inquiries made in London by the Agent-General indicated that, notwithstanding the war, it was desired to maintain Great Britain's export trade, and that every effort would be made to ensure manufacture of the equipment. Consequently orders for hydraulic turbines, generators and transformers were placed with English manufacturers.

Delay was experienced in bringing the existing turbines at Tarraleah up to their guaranteed efficiency and tests have been conducted in order to improve the output of each machine. According to model tests carried out at the manufacturers' works the efficiency of the machines will be improved when buckets of a modified design have been fitted.

Record Output and Revenue

The 551.2 million kWh generated by the Commission's plant during 1939-40 was divided as follows: Waddamana, 278.4 million kWh; Tarraleah, 216.4 million kWh; Shannon station, 56.3 million kWh; and a small quantity at the Devonport standby station. The system peak load was 112,000 HP, of which 5,000 HP was considered to be war-emergency load.

The Commission sold 505.1 million kWh compared with 467.0 million kWh in 1938-39, an increase of 38.1 million kWh (8 per cent.) Of this total 383.6 million kWh was disposed of in bulk, 72.3 million kWh was sold retail in country districts and 49.1 million kWh was distributed in the Hobart metropolitan district, In Hobart, where the Commission last year opened imposing new headquarters, consumers number 17,490. In the country areas a supply was provided to two additional municipalities (Straham and Lilydale) and the undertakings at Scottsdale and Burnie were taken over by the Commission. Consumers at the end of the year numbered 19,523, and over 10 per cent. of these used electric ranges.

Charges Reduced

The total revenue for the year was £605,672 (against £551,263); this was the largest yet recorded. Increased business was due not only to greater industrial requirements due to the war, but also to improved domestic sales. It was decided during the year to reduce charges by an amount representing an annual saving to consumers of £13,727, and it is pointed out that electricity is probably the only commodity whose price has been lowered since the beginning of the war.

Operating expenses amounted to £182,451 (£159,189) and capital and other charges totalled £403,609 (£356,329). After transferring £16,500 (£30,000) to general reserve there was a balance of £3,501 (£5,744).

Ulster Coal Shortage

THE question of imposing a more stringent coal rationing system is being investigated in Northern Ireland, all of whose supplies have to be shipped from Great Britain. Much is being done to develop the use of peat as fuel in the rural areas.

Appealing to housewives to reduce the consumption of coal, gas and electricity to the minimum, the Minister of Commerce says that although supplies sufficient to meet present needs are coming forward, stocks in reserve are quite inadequate. He urges householders to economise in every possible way and to lay up stocks of wood for winter use, so that industrial establishments and public utility undertakings such as railways, gas works and power stations may be able to build up more adequate reserves for the coming winter.

Portuguese Imports

U.S.A. Capturing German Trade

THE following statement showing the values of the imports into Portugal last year of the principal lines of electrical goods has been extracted from the recently-issued foreign trade returns of that country. Notes of increases or decreases compared with 1939 have been added.

Telephone installation material was apparently the only important group in which increased import trade was transacted. In many instances the business lost by Germany was gained by the United States and that country's share of the market expanded almost throughout. The United Kingdom made a good showing in the cable trade, in which Belgium was a strong competitor in the earlier part of the year.

Although there was a notable decline in the value of radio apparatus imported into the country, the United States increased its quota very considerably. There was also a decline in the total of machinery imports, but both the United Kingdom and the United States supplied more.

War measures have restricted Portugal's foreign trade, both import and export, and transactions between the sterling area and Portuguese territory have to be settled through special accounts. Yet imports as a whole last year were about 25 per cent. in excess of 1939. During 1941 however, so far as figures are available, there have been declines on both sides of the account. The exchange rate for escudos varied between 96 and 108 to the £ during 1940.

	1940 Escudos (000)	Inc. or dec. on 1939 Escudos (000)
Accumulators and condensers weighing per cell less than 8 kg.—		
Total	1,992	+ 348
From Germany	20	— 167
,, United States	1,477	+ 642
,, United Kingdom	267	+ 7
,, Canada	125	+ 9
Other elec. accumulators and condensers and parts—		
Total	948	— 643
From Germany	12	— 81
,, United States	415	+ 161
,, United Kingdom	188	— 81
,, Canada	176	+ 67
Loud speakers—		
Total	308	+ 56
From United States	275	+ 129
,, United Kingdom	12	+ 5
Radio apparatus—		
Total	7,039	—3,363
From Germany	724	— 306
,, United States	4,141	+1,341
,, United Kingdom	678	— 256
,, Holland	1,129	—3,913
Telephone apparatus—		
Total	1,545	— 816
From Germany	42	— 58
,, United States	56	+ 16
,, United Kingdom	1,292	+ 223
,, Sweden	67	— 805
Refrigerators—		
Total	961	+ 55
From United States	736	+ 128
,, United Kingdom	62	+ 23
,, Sweden	163	— 41
Generators, motors, transformers and parts, weighing up to 100 kg.—		
Total	4,310	—2,121
From Germany	473	—1,529
,, United States	1,344	+ 463
,, United Kingdom	1,052	+ 330
,, Switzerland	390	— 452
Ditto, weighing 100 to 500 kg.—		
Total	2,454	— 676
From Germany	332	— 590
,, United States	414	+ 371
,, United Kingdom	661	+ 331
,, Switzerland	522	— 464
Complete installations for telephone exchanges (not including telephones, accumulators or dynamos)—		
Total	1,964	+ 729
From United Kingdom	1,458	+1,316
,, Sweden	430	— 452
Insulators, not porcelain—		
Total*	70	+ 12
Insulating materials and porcelain insulators—		
Total	1,724	— 891
From Germany	363	— 813
,, United States	385	+ 55
,, United Kingdom	365	+ 3
Batteries, dry—		
Total	642	+ 268
From United States	109	+ 74
,, United Kingdom	326	+ 305
Batteries, other —		
Total*	31	+ 11
Vacuum cleaners—		
Total	739	+ 8
From United States	385	+ 375
,, Sweden	233	— 198
Insulated wire or cable, tertile-covered, weighing up to 120 grammes per metre—		
Total	601	— 193
From Belgium	152	+ 110
,, United Kingdom	322	+ 156
,, United States	81	+ 35
Ditto, weighing over 120 grammes per metre—		
Total	2,021	—1,739
From Germany	155	— 535
,, Belgium	873	+ 422
,, United Kingdom	857	+ 493
Ditto, with asbestos, and metal protected—		
Total	8,605	+ 235
From Belgium	3,041	— 259
,, United States	206	+ 202
,, United Kingdom	4,100	+2,845
,, Italy	494	+ 444
Ditto, with rubber—		
Total	2,028	— 402
From Belgium	1,544	+ 414
,, United States	193	+ 177
,, United Kingdom	214	— 6
Lamps, for lighting or heating—		
Total	5,218	—2,958
From Germany	406	— 947
,, Hungary	1,241	+ 470
,, Holland	1,762	—3,100
,, United Kingdom	534	+ 418
Other electric lamps—		
Total	2,114	— 232
From Germany	501	— 225
,, United States	803	+ 385
,, United Kingdom	286	— 55
,, Holland	296	— 368

*Mainly from the United Kingdom.

COMMERCE and INDUSTRY

Woolwich Council's Decision. Engineering Training.

The Woolwich Vacancy

At a meeting of Woolwich Borough Council the question as to the salary to be paid to the borough electrical engineer, the appointment for which had been advertised, came up for discussion on a recommendation of the General Purposes Committee that the appointment be re-advertised in accordance with the terms and conditions of the agreement made between the National Joint Committee of local authorities and chief electrical engineers in the electricity supply industry, which in respect of the Borough of Woolwich has fixed the salary for the first year at £1,718, second year £1,924, third year £2,080, and so on, in accordance with the output in kWh of the undertaking. Councillor Walters, who opposed the recommendation, said that Woolwich had had no voice in the negotiations in connection with the agreement, although they had a representative on the Committee concerned. He contended that before such an agreement was ratified it should be submitted to interested parties. He felt the Council should ignore the agreement.

The Committee's recommendation was also opposed by Councillors Campbell and Harvey, and Councillor Barefoot, in reply, said the Council needed a first-class man and they would not get him unless they honoured this agreement. After further discussion the Committee's recommendation was approved by twenty-eight votes to five.

Chief Engineers' Salaries

At a conference of representatives of electricity undertakings in the No. 2 area, held recently in Leeds, it was decided not to proceed with the formation of a District Joint Committee with the chief electrical engineers.

Training for the Engineering Industry

Arrangements for providing higher-grade courses at Government Training Centres, Technical Colleges and in industrial establishments where the equipment and instructors are available are now to be developed to the fullest possible extent. The courses will normally last a few weeks.

Under this scheme the employer can get his skilled operatives trained to a higher degree free of charge. The operatives remain on the employer's pay-roll during training and return to their employers afterwards. In appropriate cases the Ministry of Labour and National Service is prepared to provide some financial assistance to meet the expenses which the employer may incur owing to the men's absence, and to arrange for trainees from Government Training Centres to take the places of men undergoing training. In certain circumstances allowances for travelling and lodging will be payable to the trainee. Employers in need of skilled workers for setting or for toolroom work and unable to train their own operatives are urged to get in touch with the Divisional Controller of the Ministry in their area or their nearest Employment Exchange. A leaflet P.L.92/1941 describing the facilities available under the scheme is being distributed to employers in the engineering industry, and any interested employer who does not receive a copy should apply to the nearest local office of the Ministry of Labour and National Servi ce

A Charge Engineer's Holiday

It will be recalled that the Electrical Power Engineers' Association recently expressed the view that the holidays to which members were entitled under the National Joint Board agreement should be given so far as present circumstances permitted. No particular undertaking was entitled to decide to curtail or withhold holidays; any such decision lay with the Joint Boards to which disputes should be referred.

At a meeting of the Weymouth Town Council it was reported that a charge engineer in the Electricity Department, Mr. C. W. J. Condon, had been dismissed for absenting himself from duty without permission. The Town Clerk, in reply to protests by members of the Council, explained that a resolution had been passed asking employees to be satisfied with one week's holiday. Later that was altered and employees were asked to take half their holidays with a minimum of one week. There were objections from the Electricity Department's staff and it was decided that any disputes should be referred to the Joint Industrial Council and probably the National Arbitration Tribunal.

Notwithstanding the reference of the matter to the Joint Industrial Council holidays in the Department were arranged and the station superintendent put up a list. Other members of the staff were content to put down a week until the Joint Industrial Council's decision had been given, but Mr. Condon put on the list the full holiday to which he was entitled. He went away and did not return. His absence had caused inconvenience at the works and the Committee felt that such gross misconduct called for the termination of his services.

After further debate the Committee's action was approved.

Transformer Magnetisation

No specification has hitherto catered adequately for the testing of materials subject to incremental magnetisation, produced by combined AC and DC, such as transformers and similar devices employed in communication engineering. B.S.S. 933 not only does so, but also provides for permeability measurement by AC methods at frequencies appropriate both to power and to communication technique. In addition the newer document specifies precision methods of iron loss measurement extending into the audio-frequency range which, while framed essentially for the incremental case, actually represents the first standardisation in this country of the potentiometer and bridge (AC) in iron loss measurement. While dealing with steel sheets of varying silicon content, and with nickel-iron strip, the size of stamping envisaged is smaller than that with which the earlier B.S.S. 601 was generally concerned. Nevertheless the newer methods may

become applicable in special cases associated with the larger types of apparatus. Copies of the latest specification are obtainable from the British Standards Institution, 28, Victoria Street, London, S.W.1., price 2s. 3d. post free.

Protection Against Fire

For many years past special products of Wailes Dove Bitumastic, Ltd., have been used for the purpose of protection against corrosion and for covering ships' decks. Certain minor modifications in manufacture are claimed to have rendered one of these preparations suitable to be laid on flat roofs, or top floors, of warehouses and other buildings as a protection against incendiary bombs, one of which has been allowed to burn itself out on wooden flooring upon which a 1-inch thick "carpet" of "mastic" had been laid. Subsequent examination is said to have shown that the damage to the "mastic" was restricted to partial penetration, less than 0.25 inch in depth. When cut and lifted the underside of the "mastic" is declared to have been no more than warm to the touch, while the wood flooring underneath was quite cool. Of two treatments available for glazed roofs, to minimise loosening of shattered glass, one effects complete "blackout," while a third treatment for windows and glass partitions is described as of the "daylight" type.

"Wayne" self-winding cable reels in use on an aircraft spar milling machine and (left) an industrial vacuum cleaner

Welding Steels

Recent investigations by the Institute of Welding have indicated that unless special precautions are taken the weldability of high tensile steels used for structural purposes will be impaired by hardening at the weld boundaries. The degree of this effect can be lessened by reducing the carbon content. Accordingly war emergency B.S.S. 968 for "high tensile (fusion welding quality) steels," abbreviated to H.T.W., limits the content to a maximum of 0.23 per cent. instead of the 0.3 per cent. allowed by B.S.S. 548, which has hitherto covered all H.T. structural steels. Copies of the new specification may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1., price 2s. 3d. post free.

Self-winding Cable Reels

Wartime conditions are providing many new opportunities for the "Wayne" self-winding electric cable reels to demonstrate their advantages. Apart from their use on all types of machine tools, cranes, conveyors, hoists, lifts, stacking machines, loaders, welders, etc., the makers, Power House Components, Ltd., inform us that they are much in demand in aircraft factories for use on long traverse machines for shipping propellers, etc. In the Wadkin aircraft spar milling machine illustrated the travel is about 30 ft. and provision had to be made for a cable containing twelve conductors. This was achieved by means of a special reel with seven slip rings on one side and five on the other. The other application illustrated shows one of the self-winding electric cable reels fitted to an industrial vacuum cleaning plant.

The reels are available in various sizes with drums of from 1 to 4 ft. in diameter, and where space is a consideration gears with a 2 or 3 to 1 ratio can be incorporated. The standard length of cable fitted is 50 ft. For the sake of lightness the drums are usually made of a zinc alloy (before the war aluminium was used), cast-iron endplates giving strength and rigidity. The electric pick-up gear is of the floating plunger type acting on slip rings, all the connections being totally enclosed. Operating on the same principle as a roller blind, the reel permits only sufficient cable to be paid out to reach the desired point, automatically rewinding it on to the drum when no longer required.

Schoolboys at Power Station

At a recent meeting of the Blackpool Corporation Education Committee the director of education reported that the Electricity Committee had received an application from the head master of the Arnold Boys' School for one of his pupils to attend at the electricity works during the summer holidays and that the Committee had referred the matter to the Education Committee. The latter Committee authorised the director of education to arrange for selected boys from all suitable schools to have similar facilities.

The Engineer and the War

Mr. J. Dallas, who is on the staff of Ferranti, Ltd., joined the Army at the outbreak of war.

He was commissioned in the Royal Corps of Signals and went to Norway with the Expeditionary Force, being seriously wounded at Andalsnes. Unfit for further military service he has returned to Ferranti's. Recently he delivered an address to his colleagues at the company's works which has now been printed in pamphlet form. In it he explained how dependent the Army is upon the output of the workers in the factory, and urged them to play their part by increasing their concentration upon the duty entrusted to them.

Traders' Difficulties

A deputation of Members of Parliament of the 1922 (Conservative Members) Committee met the President of the Board of Trade on August 7th to express their concern with the difficulties of small traders and small manufacturers, particularly emphasising such difficulties as might be due to unequal distribution of the supplies that were available.

Sir Andrew Duncan said that he was fully alive to the small traders' difficulties. He gave an assurance that multiple shops and large stores were receiving no preferential treatment in any arrangements over which the Board of Trade can exercise control, and promised to keep the whole position of small traders under his personal observation. He also promised that his Department would examine any allegations of serious inequality in distribution.

Purchase Tax Decisions

Among the new decisions regarding liability to Purchase Tax which have been given by the Commissioners of Customs and Excise are the following:—Under class 1 (b), eye shields and face shields for industrial A.R.P. purposes, which are held by the hand, supported on the head by straps or bands, or suspended from the rims of helmets by clips or bands are not chargeable; safety belts, also in class 1 (b), which have ropes, hooks, or similar devices, for securing the wearer to an external support, are in addition not chargeable.

Trading with the Enemy

The Board of Trade has made a new Order, the Trading with the Enemy (Specified Persons) (Amendment) (No. 12) Order, 1941 (Statutory Rules and Orders, 1941, No. 1071), containing 172 additions to the "Black List" of traders in neutral countries with whom it is unlawful to have dealings of any kind. Further additions will be made in due course. Copies may be obtained from H.M. Stationery Office, price 2d. each.

The Board of Trade and the Ministry of Economic Warfare announce that Finland is to be regarded as enemy-occupied territory for the purpose of the Trading with the Enemy Act and of economic warfare. It is accordingly a punishable offence to have commercial, financial, or other intercourse or dealings with or for the benefit of any person in that territory as from August 2nd. Moreover, Finland will be regarded as an enemy destination for contraband purposes, and all goods originating or owned in that territory will be liable to seizure.

A Stay-at-Home Holiday

A considerable proportion of the workpeople of Laurence, Scott & Electromotors, Ltd., were on holiday during August Bank Holiday week, and in view of the Government's request that people should stay at home, the company arranged a special week at its Social Club. Each day a programme of events was arranged, including a bowls match, open-air whist drive, horticultural show, a baby show, darts and billiards competitions, cricket match, display by A.R.P. services and the L.S.E. Home Guard, children's sports and dances, from which it will be seen that a stay-at-home holiday, when well organised, can provide a very enjoyable week of relaxation.

Changes of Address

Troughton & Young, Ltd., have removed their showrooms to Imperial Court (Basil Street), Knightsbridge, S.W.3. All invoices, statements, etc., should, however, be sent to their general offices at Birtley House, Bramley, Nr. Guildford (telephone: Bramley 3325).

The London office of the Brush Electrical Engineering Co., Ltd., and of the Brush Coachwork, Ltd., has been moved to Bush House, North West Wing, Aldwych, London, W.C.2.

Petters, Ltd., have reopened their London office at Bush House, Aldwych, London, W.C.2.

TRADE MARK APPLICATIONS

THE following applications have been made for British trade marks. Objections against any of the applications may be entered within a month of August 6th.

REDISEM. No. 615208, Class 7. Small electric motors (not being motors for land vehicles), electric alternators and electric generators. Rediffusion, Ltd., Bush House, Aldwych, London, W.C.2.

KYLSTRON. No. 612184, Class 9. High-frequency amplifiers, oscillators, detectors, phase-shifters, and frequency shifters for use in electrical apparatus. Sperry Gyroscope Co. Inc., Manhatton Bridge Plaza, Brooklyn, U.S.A. Address for service: c/o Stevens, Langner, Parry & Rollinson, 5–9, Quality Court, Chancery Lane, London, W.C.2.

SURTAL, TALYSURF AND SURFOTAL. Nos. 614949–51 respectively, Class 9. Precision measuring instruments. Taylor, Taylor & Hobson, Ltd., 104, Stoughton Street, Leicester.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

YOUNG mica under-cutting machine.

ELECTRICITY SUPPLY

Sheffield Charges. Irish Power Scheme.

Blackburn.—LIBRARY HEATING.—The Corporation electrical engineer (Mr. R. H. Harral) has been authorised to install a new heating system at the public library, museum and art gallery at a cost of £240. This will replace the existing hot-water system.

CATHEDRAL SUPPLY.—The Cathedral Council has applied for an additional supply of electricity for an electrode boiler. The Corporation has sanctioned the scheme, which will cost £1,264.

Cheltenham.—FRINGE ORDER.—The Corporation Electricity Committee has been informed that the Electricity Commissioners are prepared to make a Fringe Order to supply premises if the local authorities are agreeable.

Eccles.—PRICE INCREASE.—The Corporation Electricity Committee recommends a temporary war increase in charges of 5 per cent.

Glasgow.—POLICE HEADQUARTERS, INSTALLATION.—The Corporation Police Committee has arranged for the Electricity Department to undertake the electrical work at the Southern Police headquarters extension at a cost of £220.

MAINS EXTENSIONS.—The Corporation Electricity Committee is to extend mains at a cost of £8,700.

Hull.—SCHOOL SHELTER INSTALLATIONS.—The Corporation is to provide lighting and heating in all school shelters at a cost of £16,945.

Isle of Ely.—KETTLES FOR WARDENS' POSTS.—The County Emergency Committee has sanctioned the provision of electric kettles at certain wardens' posts, but considerable difficulty has been experienced in obtaining them. Further efforts are to be made to get the kettles from sources suggested by the Committee.

Morley. — VOLTAGE STANDARDISATION. — To complete the voltage change-over the Town Council is to apply for sanction to a loan in connection with the erection of a substation.

Northumberland. — SHELTER LIGHTING. — The County Emergency Committee has obtained sanction for lighting the more important public shelters by means of electricity.

Oxford.—TARIFF REVISION DEFERRED.—The question of revising electricity charges, which remain at the pre-war level, has recently been under consideration by a sub-committee. Having considered the sub-committee's report, the Electricity Committee recommended that in view of the sound financial condition of the undertaking, the matter should be deferred until after the figures for the half-year ended September 30th are available.

Ruthin.—PROGRESS. OF CHANGE-OVER.—At a recent meeting of the Electricity Committee the engineer (Mr. Thornton) reported that a further section of the change-over had been completed, and it was proposed to carry out another section during the present month. He was authorised to make arrangements for disposing of the remainder of the plant at the power house.

Scarborough.—SUBSTATION.—The Corporation Electricity Committee is to erect a substation at a cost of £386.

Sheffield.—TARIFF AMENDMENT.—It is not proposed to take any further steps at the moment in regard to the contemplated increase in electricity charges generally, but the Electricity Committee recommends that, subject to the approval of the Electricity Commissioners, the "unit" charge specified in tariffs 3 (a) and (c) shall be deemed to be based on an average cost of coal to the Department of 22s. per ton. If during any "accounting period" (the time between two consecutive readings of a consumer's meter) the average cost exceeds this figure, the "unit" charge shall be increased for that accounting period by 0.01d. for every shilling per ton increase, and proportionately for every fraction of a shilling rise. Consumers under these tariffs are not at present subject to a coal clause.

Stalybridge.—OFFICE HEATING.—The Corporation has appointed a committee to consider a scheme for the central heating of offices.

Wisbech.—HOSPITAL INSTALLATION.—The Joint Hospital Board is contemplating the installation of electrically operated washing apparatus at the hospital, and estimates are to be obtained from the Cambridge Electric Supply Co. for the supply of electricity to the hospital.

Overseas

Eire.—PEAT POWER SCHEME.—A million-pound estimate recently introduced into the Dail for special emergency schemes included a grant of £117,215 to the Turf Development Board. This sum included £83,565 for the development of Clonsast and other bogs. The plans of the Turf Development Board to increase turf production through machine cutting have not realised expectations, because of the obstacles to obtaining the essential additional plant. Since the war began the importation of turf-cutting machines has ceased; on the other hand their home manufacture has been impeded by the lack of steel and other parts. The same sort of difficulties are likely to delay the construction of the turf-fired electricity generating station on Clonsast bog. This station was estimated to produce 90 million kWh per annum with a consumption of 120,000 tons of turf yearly, the cost of the station itself being estimated at £800,000.

CURTAILMENT OF SUPPLY.—Because of electricity consumers not having voluntarily cut down their consumption by at least 25 per cent., the supply has been considerably reduced in several areas. In some parts of Eire consumption is restricted to the hours of 10 a.m. to noon; 4 p.m. to 6 p.m., and 10.30 p.m. to midnight.

United States.—ST. LAWRENCE SEAWAY SCHEME.—The Rivers and Harbours Committee of the House of Representatives has approved the $285,000,000 St. Lawrence seaway project for inclusion in the omnibus Rivers and Harbours Bill which is shortly to be submitted to Congress. It will be recalled that an agreement to start work

on the St. Lawrence navigation and power scheme was signed by representatives of the United States and Canada in March. Its immediate objects are, first, to increase the power production of the International Rapids section of the St. Lawrence River and, secondly, to provide an outlet for shipbuilding facilities in the Great Lakes area.—*Reuter.*

TRANSPORT

Coventry.—FARE REVISIONS.—Further adjustment of the fares on the Corporation transport services has been proposed by the Transport Committee to meet the additional costs imposed by the recent wage increase received by the undertaking's employees. The proposals include a minimum fare of 1½d., an increase of 1d. on all workmen's return tickets and the abolition of the temporary wartime concession of issuing workmen's return tickets on Sundays.

Glasgow.—RATE CONTRIBUTION.—The Corporation Transport Committee has decided to contribute £22,039, representing the surplus revenue of the Transport Department for the past year, to the Common Good fund.

South Shields.—TROLLEY-BUS EXTENSION.—The Town Council has referred back a proposal by the Transport Committee to extend the trolley-bus route. The original route of the proposed extension is to be amended.

Sweden. — RAILWAY ELECTRIFICATION. — Both Chambers of the Riksdag have agreed to the Swedish Government's proposal for the electrification of the railway lines Hälsingborg-Hässleholm, Hälsingborg-Eslöv, Sundsvall-Ange and Gävle-Ockelbo, a total distance of 259 kilometres.

A first allowance of Kr.15,000,000 was granted for the starting of the works. They hav alsoe agreed to the Government's proposal for the acquisition by the State of several private railways, including the Växjö group of railways in the province of Smaland, with a total length of 319 km., lines totalling 245 km. around the South Swedish town of Ystad, and the Kalmar-Torsas Railway in the province of Smaland, 40 km. The total sum to be paid for these railways is Kr.13,590,000.

West Hartlepool.—PROFIT FROM TROLLEY-BUSES.—Further details are available of the earnings of the Corporation's trolley-bus service during the year ended March 31st last. The undertaking made a profit of £6,365. Income amounted to £20,585 (19.57d. per vehicle-mile) and working expenses were £14,350.

Parliamentary News

By our Special Reporter

Torches and Batteries

IN the House of Commons recently Mr. Naylor asked the Parliamentary Secretary to the Ministry of Supply if steps had been taken to ensure a sufficient supply of torches and batteries in the forthcoming winter; and if present prices of batteries were to be maintained.

Captain Waterhouse said that the reply to the first part of the question was in the affirmative. Some small alterations in the maximum prices at present in force for certain types of batteries would probably be necessary. The Central Price Regulation Committee had the matter under consideration and a revised Order would be issued shortly.

Control of Electricity

On August 5th, Sir Arnold Gridley asked the Prime Minister whether he would consider taking steps to relieve the Minister of War Transport, who was appointed in order that the control of wartime communications should be brought under the undivided direction of a single Minister, of the burden of the responsibilities in connection with electricity which were among the functions of the Minister of Transport.

Mr. Attlee, who replied, said that it was always the Prime Minister's intention that certain functions of the former Ministry of Transport should be transferred to the Board of Trade or other Departments and he had now arranged for the responsibilities referred to to be transferred to the Board of Trade. This arrangement would not, of course, preclude consideration at some later stage of a more comprehensive re-alignment of Departmental responsibilities for fuel and power services.

The Grampian Bill

On August 6th Mr. Denman asked the Secretary of State for Scotland when the Council of Ministers on Planning expected to be able to give the House clear guidance as to whether the proposals of the Grampian Electricity Supply Order were in accordance with a plan for the most desirable development of the Highlands water power, or otherwise in accord with the national interests.

Mr. Johnston said that the question of the promotion of hydro-electric schemes by private legislation did not fall within the scope of the Council of Ministers referred to. It would not be appropriate for him at that stage to anticipate the terms of the statement which would be made in the forthcoming debate upon the Grampians Order.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Ward & Goldstone, Ltd., report a net profit for the year ended March 31st of £49,069, as compared with £57,439 for the preceding year. After deducting £1,500 transferred to employees' provident scheme, £600 directors' fees, and £10,710 for depreciation, and adding £30,212 brought in, there is a balance of £66,471. As already announced the final dividend on the ordinary stock is 10 per cent. again making 20 per cent. for the year, and £31,107 is carried forward.

In his review of the past year, which has been issued with the report and accounts, Mr. M. H. Goldstone states that production during the year has increased. Due regard to the importance of their export trade has made possible a further marked expansion in this branch of industry.

The Cawnpore Electric Supply Co., Ltd., reports a profit for 1940 of £96,692, as compared with £79,821 for the previous year. After deducting depreciation and renewals, £35,000, income tax, £5,000, and debenture sinking fund, £12,505, it is proposed to pay a final ordinary dividend of 7 per cent., again making 10 per cent. for the year. The balance carried forward is £16,358 (against £7,871 brought in).

The Delhi Electric Supply & Traction Co., Ltd., is paying a final dividend of 5 per cent., maintaining the distribution for the year at 9 per cent., free of tax.

The Victoria Falls & Transvaal Power Co., Ltd., reports that the net profits, after tax, declined from £681,790 in 1939 to £583,066 for 1940. The preference and ordinary dividends are maintained at 10 per cent. and 15 per cent. respectively, reserve receives £150,000, and the balance carried forward is £312,004 (against £273,047 brought in).

The report states that sales during the year showed a satisfactory increase over those of the previous year, and the sales for the first six months of the current year show a further increase over those for the corresponding period of 1940. Work has continued during the year on the two large power stations which the company is erecting on behalf of the Electricity Supply Commission of South Africa, and in the case of the larger of these stations the last of the twelve sets for which the station was designed was brought into service during the year. An extension to the boiler house and boilers is now in hand. In the case of the other station work has continued on the site and contracts for all the plant have been placed and work thereon is proceeding as well as the present circumstances permit. Both these stations will be operated by the company which will take the entire output therefrom. Satisfactory arrangements have been made with the City Council of Johannesburg to assist each other to meet the requirements of consumers in times of need. The company has during the year carried out large extensions to its own undertaking and a further large programme of extensions is being carried out to meet the future demands for power which have been notified by its consumers. The directors recommend that the present paid-up ordinary and preference share capital of the company be converted to ordinary and preference stock of £1 units.

In his statement which accompanies the report and accounts Mr. A. E. Hadley (chairman and managing director) says that the increase in taxation, and to some extent the further depreciation arising by the additions made to plant, leads to the decline in the net profit. The manufacture and shipment of materials for the existing and new power stations and for the transmission system have naturally to take their place with other work of similar importance to the war effort, but they have so far continued though at a slower rate and subject to interruptions.

The São Paulo Light & Power Co., which had been given thirty days to conform to a decision of the Supreme Court, on August 5th, deposited with the Treasury the equivalent of £2,000,000 for income tax.

The Dublin United Transport Co., Ltd. (formerly Dublin United Tramways Co., Ltd.), has declared an interim dividend of 2 per cent. (against 1 per cent.).

The Greengate & Irwell Rubber Co., Ltd., is paying an interim dividend of 1s. per share (against 1s. 3d.).

Falk, Stadelmann & Co., Ltd., have announced a dividend of 7½ per cent. for the year (against 7 per cent.).

The Bognor & District Gas & Electricity Co. has announced dividends of 3¾ per cent. (against 4 per cent.) on the "A" stock, 4½ per cent. (4⅝ per cent.) on the "B" stock and 3½ per cent. (same) on the new consolidated stock.

The Calcutta Electric Supply Corporation, Ltd.—As a result of the recent decision of Mr. Justice Bennett in the Chancery Division, the preference shareholders will receive a dividend of £1 19s. 4½d. per cent. net, instead of £2 10s. for the half-year.

New Companies

F. W. Mason (Liverpool), Ltd.—Private company. Registered August 1st. Capital £2,000. Objects: To carry on the business of ship and engine repairers, electric light and power engineers, welders, refrigerating plant engineers, motor engineers, bakelite moulders, etc. Directors: F. W. Mason and M. E. Mason, both of 230, Liverpool Road South, Burscough, Lancs.

Leonard Leadbeater (Batley), Ltd.—Private company. Registered August 5th. Capital £500. Objects: To acquire the business of an electrical and general engineer carried on by Leonard Leadbeater at Batley. Directors: L. Leadbeater, Station Road, Woodkirk, Dewsbury; B. Hudson, Soothill Lane, Batley; and E. Whitaker, Dalewood Avenue, Sheffield. Registered office: 77, Bradford Road Central, Batley.

Turpin, Knott and Murfitt, Ltd.—Private company. Registered August 2nd. Capital £1,000. Objects: To carry on the business of mechanical, electrical and general engineers, manufacturers, repairers and letters on hire of machinery,

implements and engineering requisites, etc. Directors: J. L. Murfitt, 131, Finchley Lane, N.W.4, S. E. Nott, 2, Greenway, Totteridge, N.20, C. C. Turpin, 11, Edgehill Avenue, Finchley, N.3. Registered Office: 2, Hendon Lane (rear part), N.3.

Companies' Returns

Mortgages and Charges

Utilities (London), Ltd.—Debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated July 18th, 1941, to secure all moneys due or to become due from the company to Lloyds Bank, Ltd.

Satisfaction in full on July 18th, 1941, of first mortgage debenture dated November 24th, 1938, and registered November 24th, 1938, securing £1,500.

Kelvin Norton Electric Co., Ltd.—Equitable charge on proceeds of an order, dated July 22nd, 1941, to secure all moneys due or to become due from the company to Midland Bank, Ltd.

Underwood (Electric), Ltd.—Assignment of proceeds of certain contracts, dated July 25th, 1941, to secure all moneys due or to become due from the company to Martins Bank, Ltd., not exceeding £1,200.

John Chatfield (Components), Ltd.—Satisfaction in full on June 3rd, 1941, of two debentures dated January 3rd and March 17th, 1941, and registered January 22nd and March 22nd, 1941. (According to the register of mortgages the two debentures registered January 22nd and March 22nd, 1941, originally secured all moneys due to bank.)

Service R. A. P., Ltd.—Assignment of contract moneys, dated July 21st, 1941, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Bankruptcies

A. W. Schofield and D. Tanner (Schofield & Tanner), registered electrical and radio engineers, 673, Manchester Road, Denton.—Trustee, Mr. F. E. Bendall, 31, Lloyd Street, Albert Square, Manchester, released July 14th.

F. J. Harrison (C. W. H. Electrical Co.), electrician, Dicconson Street, Wigan.—First and final dividend of 1s. 7d. in the £, payable August 15th, at 8, Victoria Street, Liverpool.

H. Beaumont, electrical engineer and radio dealer, 207, Luck Lane, Paddock, Huddersfield.—Trustee, Mr. E. T. Sanders, 71, Manningham Lane, Bradford, Official Receiver, released August 1st.

J. H. Matthews, electrical dealer, 232, Town Street, Bramley, nr. Leeds.—Last day for receiving proofs for dividend, August 22nd. Trustee, Mr. H. C. Bowling, 24, Bond Street, Leeds, Official Receiver.

H. Stansfield, electrician, 25, Sunnydale Park, Ossett, lately carrying on business at 7, Station Road, Ossett, as an electrician, but now a journeyman electrician.—First and final dividend of 2s. 10½d. in the £, payable August 19th, at 71, Manningham Lane, Bradford.

Liquidation

Westward Electrical Co. (1928), Ltd.—Meeting pursuant to section 245 of the Companies' Act, 1929, on September 5th, at 35, Windsor Place, Cardiff, to receive an account of the winding-up by the liquidators, Messrs. L. S. Findlay and G. M. Davies.

Meeting of Creditors

Howard Smith (Electrical Engineers), Ltd.—A meeting of creditors will be held at 3, Abchurch Yard, Cannon Street, London, E.C.4, on August 19th, for the purposes mentioned in sections 239 and 240 of the Companies' Act, 1929.

NEW BOOKS

The Calculation and Design of Electrical Apparatus. By W. Wilson, D.Sc., B.E., M.I.E.E., M.Amer.I.E.E. Third edition (revised). Pp. 240; figs. 26. Chapman & Hall, Ltd., 11, Henrietta Street, London, W.C.2. Price 10s. 6d.

Since its appearance in 1934, Dr. Wilson's book has occupied an almost unique position in the literature of electrical engineering. For two editions to be forthcoming in wartime is eloquent testimony to its intrinsic worth and of the author's endeavour to keep the book both correct and up to date. Probably the work is of the greatest assistance to those fellow designers in the manufacturing industry to whom reference is made.

This new edition comprises all the useful subject matter of the previous editions, most of which has been given fuller and more practical treatment, together with a very welcome increase in the number of worked-out examples from actual practice.

The work is essentially practical; scientific formulæ are frankly taken as the designer's tools as much as the tables and data diagrams. Thus it has been possible to give fairly adequate treatment in a small book to the calculations affecting heating of conductors including the calculations of busbar and other heavy conductors, resistors for generator and motor field-circuits, electro-magnets, the reactance of feeder lines, the breakdown of insulation, the calculation of short-circuit kVA is supply systems, and the interpretation of oscillgrams in their bearing on the rating of circuit breakers. All engineers connected with technical problems of this kind will find the book very useful.—S. P. S.

The Cathode Ray Oscilloscope. By W. E. Miller, B.A. (Cantab.), M.Brit.I.R.E. Second edition. Pp. 47; figs. 34. *The Wireless & Electrical Trader*, Dorset House, Stamford Street, London, S.E.1. Price 2s.

Since the publication of the first edition of this practical manual little, if any, change has taken place either in commercial oscilloscope design or use, and it has therefore not been felt necessary to make any alteration to the text.

Although the book was originally intended mainly for the use of radio service engineers, it has since been found of particular interest to those who, in technical colleges and in the Services training schools, are coming into contact with such apparatus for the first time.

STOCKS AND SHARES

TUESDAY EVENING.

THE announcement by the Chancellor of the Exchequer that the present issue of two and a half per cent. War Bonds would be withdrawn on Thursday in this week had the effect of confirming the strength of prices for other gilt-edged securities. No doubt the Government will substitute another shape of borrowing, details of which were expected with no little interest in the consol market of the Stock Exchange, where the firmness of prices has recently exerted a sympathetically favourable influence over those in other investment departments.

The Treasury will continue to offer the three per cent. Savings Bonds and, through the Post Office, the three per cent. Defence Bonds, but it cannot be long before information is published as to the direction in which fresh Government borrowing will develop. Prices of ordinary shares in the front-rank companies are being held extremely well. Stock Exchange brokers report that the volume of business they are now called upon to handle shows a decided improvement over the corresponding days of last year.

Home Railway Hopes

The Government is thought, rightly or wrongly, to have adopted a more sympathetic attitude towards the home railway companies than opinion had previously assumed. From remarks made by the Minister of Transport, it has been taken for granted that the new arrangement, when its publication is at length permitted, will at least maintain the railways' dividends on the same basis as those paid for the whole of 1940.

On the strength of this, prices have further improved upon the gains that occurred a week ago. In this advance London Passenger Transport "C" stock has participated to the extent of 2½ points, although for some unexplained reason the stock still remains unpopular with many home railway investors.

Electricity Supply Shares

Previous mention has been made of the fact that even at the present-day prices, allowing as they do not much more than 4¼ per cent. on the money, electricity supply ordinary shares are in demand from trusts and what are called institutional investors, who put capital into these shares on the ground that electricity supply undertakings are as sound and stable as any that can be found in the industrial world.

The absorption of these shares by the permanent investor has had the effect of clearing the market of most of its floating supply. Nowadays the would-be purchaser has frequently to wait before he can carry out his intention of buying electricity supply shares in one particular company; and, were it not for what the Stock Exchange colloquially calls "corpses," the amount of stock which comes to market every week would fall far below the supply required by investment.

More Rationing?

Renewed talk of the likelihood of coal and light being rationed arouses recollection of the puzzling forms which the householder was asked to fill up soon after the outbreak of war in order that his supplies might be adjusted according to the national need. The information given on these particular forms has not been brought into practical service; possibly the forms themselves have been destroyed by the Government Department which furnished them. It would hardly be surprising, however, if some means of rationing were to be adopted, in view of the seriousness with which the coal situation in the coming winter is regarded.

From the merely Stock Exchange point of view this proposal, or the rumour of it, has made no difference to quotations. Electricity supply shares are held by investment which, very naturally, declines to cease from participation in one of the most solid industries of the times and one which, after the war, will remain a one-way street to expansion and prosperity. The only changes in price are rises of ⅛ in City of London ordinary and of 6d. each in Edmundsons ordinary and 7 per cent. preference.

Price Fluctuations

Calcutta Trams have risen by 5s. 9d. to 23s. 9d. on the execution of substantial buying orders from India. It is well known, of course, that Indian industries are doing extremely well at the present time. Any demand for shares of Indian companies that comes upon a market sparsely supplied with shares has a disproportionate effect upon the quotation. Calcutta Electrics have hardened to 36s. Madras Electrics at 23s. are unchanged, but are ex the dividend recently deducted. The Cawnpore Electric Supply Company shows an increased profit of about £17,000. The dividend is maintained at 10 per cent. for the year, and the price of the shares remains unchanged at 27s. 6d.

Anglo-American Telegraph 6 per cent. preferred stock has risen two points to 107½ on investment demand, and Cable Preference at 103 is better for the same reason. Speculative investment is picking up Cable & Wireless ordinary stock; the result has been a rise of 3 to 63. Globe Telegraph & Trust ordinary at 28s. 9d. are ⅛ better. Marconi Marines are better at 26s. 3d., and Oriental Telephone ordinary hold their substantial rise at 62s. 6d.

Manufacturing and Equipment

Callenders stand out with half-a-crown gain at 67s. 6d. Enfield Cables, Automatic

(*Continued on page* 110)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Aug. 12	Rise or Fall	Yield p.c. £ s. d.
Home Electricity Companies					
Bournemouth and Poole	15	12½	50/9	..	4 18 5
British Power and Light	7	6	25/–	..	4 16 0
City of London	7½	7	25/–	+⅛	5 12 0
Clyde Valley	8	8	35/9	..	4 9 6
County of London	10½	8	33/3	..	4 16 3
Edmundson's: 7% Pref.	7	7	31/3	+6d.	4 9 7
Ord.	6	6	22/–	+6d.	4 9 0
Elec. Dis. Yorkshire	9	9	38/9	..	4 3 0
Elec. Fin. and Securities	12½	12½	42/6	..	5 17 8
Elec. Supply Corporation	11½	10	40/–	..	5 0 0
Isle of Thanet	2	Nil	8/6	..	—
Lancs Light and Power	7½	7½	32/–	..	4 13 9
Llanelly Elec.	5½	5½	20/–	..	5 10 0
Lond. Assoc. Electric	5½	4½	17/6	..	5 2 10
London Electric	7	7	23/9	..	5 18 0
London Power Deb. Red.	5	5	104	..	4 16 2
Metropolitan	10	8	33/3xd	..	4 16 3
Midland Counties	8	8	37/–	..	4 6 5
Mid. Elec. Power	9	9	35/–	..	5 2 10
Newcastle Elec.	7	7	27/6	..	5 1 10
North Eastern Elec.: Ordinary	7	7	29/6	..	4 15 0
7% Pref.	7	7	33/3	..	4 4 2
Northampton	10	10	43/9	..	4 11 5
Notting Hill 6% Pref. (£10)	6	6	8½	..	—
Northmet Power: Ordinary	10	7	33/3xd	+6d.	4 4 2
6% Pref.	6	6	29/6	..	4 1 4
Richmond Elec.	6	6	22/6	..	5 6 8
Scottish Power	8	8	37/–	..	4 6 5
Southern Areas	5	5	16/3	..	6 3 0
South London	7	7	23/6	..	5 19 2
West Devon	5	5	21/3	..	4 14 1
West Glos.	4½	4½	18/3	..	4 18 8
Yorkshire Elec.	8	8	38/3	..	4 4 0
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	2/6	..	—
Calcutta Elec.	8*	7*	36/–	+6d.	3 17 9
Cawnpore Elec.	10	10	27/6	..	7 5 9
East African Power	7	7	25/9	..	5 8 9
Jerusalem Elec.	7	7	18/9	..	7 9 4
Kalgoorlie (10/–)	7½	7½	12/6	..	6 0 0
Madras Elec.	6*	4*	23/–xd	+6d.	3 9 7
Montreal Power	1½	1½	24½	..	6 2 5
Palestine Elec. "A"	Nil	Nil	18/3	..	—
Perak Hydro-elec.	2½	6	17/6	..	6 17 2
Shawinigan Power	83cts.	90cts.	14½	−1½	—
Tokyo Elec. 6%	6	6	30½	..	19 13 4
Victoria Falls Power	15	15	77/6	..	3 17 4
Whitehall Inv. Pref.	7½	7½	13/9	..	10 18 2
Public Boards					
Central Electricity:					
1950–70	5	5	110	..	4 11 1
1955–75	5	5	113	..	4 8 6
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	100½	..	3 9 8
1974–94	3½	3½	94	..	3 9 2
London Elec. Trans. Ltd.	2½	2½	94	..	2 13 2
London & Home Counties 1955–75	4½	4½	106½	..	4 4 6
Lond. Pass. Trans.: A	4½	4½	113½	..	3 19 4
B	5	5	109½	..	4 11 4
C	1½	3	38½	+2½	7 15 10
West Midlands J.E.A. 1948–68	5	5	108½	..	4 12 0
Telegraph and Telephone					
Anglo-Am. Tel.: Pref.	6	6	107½	+2	5 11 9
Def.	1½	1½	24½	..	6 2 5
Anglo-Portuguese	8	8	15/–	..	10 13 4
Cable & Wireless: 5½% Pref.	4½	5½	103	+1	5 6 10
Ord.	4	4	63	+3	6 7 0
Canadian Marconi $1	Nil	4cts.	6/3	..	3 5 0
Globe Tel. & Tel.: Ord.	8½*	8½*	28/9	+⅛	—
Pref.	6	6	27/6	..	4 7 3
Great Northern Tel. (£10)	20	20	12½	..	—
Inter. Tel. & Tel.	Nil	Nil	3	..	—
Marconi-Marine	7½	7½	26/3	..⅛	5 14 3
Oriental Tel. Ord.	11½*	16	3½	..	5 2 4
Telephone Props.	6	6	11/3	..	10 13 4
Tele. Rentals (5/–)	10	10	7/3	..	6 18 0
Traction and Transport					
Anglo. Arg. Trams: First Pref. (£5)	Nil	Nil	2/–	..	—
4% Inc.	Nil	Nil	4½	..	—
Brit. Elec. Traction: Def. Ord.	45	45	860	..	5 4 8
Pref. Ord.	8	8	170	..	4 14 2
Bristol Trams	8*	8	41/3	..	3 17 8
Brazil Traction	$1	50c.	8½	..	—
Calcutta Trams	8	5½	23/9	+5/9	4 12 7
Cape Elec. Trams	5	5	17/–	..	5 17 4
Lancs Transport	10	10	40/–	..	5 0 0
Mexican Light: 1st Bonds	5	5	45	..	—
Rio 5% Bonds	5	5	85	..	5 17 8
Southern Rly.: 5% Prefd.	5	5	55½	..	9 1 10
5% Pref.	5	5	97½	..	5 2 7
T. Tilling	10	10	45/–	..	4 9 0
Tilling & B.A.	8*	7*	52/6xd	..	2 13 4
West Riding	10	10	38/–	..	5 5 4

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend 1939–40	Dividend 1940–41	Middle Price Aug. 12	Rise or Fall	Yield p.c.
Equipment and Manufacturing					£ s. d.
Aron Elec. Ord. ..	Nil	7½	20/–	+2/–	7 10 0
Assoc. Elec. :					
Ord.	10	10	42/6	..	4 14 3
Pref.	8	8	36/3	..	4 8 5
Automatic Tel. & El.	12½	12½	46/3	+⅛	5 8 1
Babcock & Wilcox	11	11	45/–	+⅛	4 17 9
British Aluminium	12½	10	46/3	+6d.	4 6 7
British Insul. Ord.	20	20	87/6	..	4 11 4
British Thermostat (5/–)	18½	18½	12/6	..	7 8 0
British Vac. Cleaner (5/–)	40	12½	6/3	..	10 0 0
Brush Ord. ..	Nil	Nil	3/–	–9d.	—
Callender's ..	15	15	67/6	+½	4 9 0
Chloride Elec. Storage	15	15	62/6	..	4 15 10
Consolidated Signal	17	17	66/3	+⅛	5 2 7
Crabtree (10/–) ..	17½	17½	26/3	..	6 13 4
Crompton Parkinson Ord. (5/–) ..	30	20	19/6	..	5 2 8
E. K. Cole (5/–) ..	10	Nil	7/–	..	—
E.M.I. (10/–) ..	5	Nil	12/3	+3d.	—
Electric Construction	10½	10	32/6	..	6 3 0
Enfield Cable Ord.	16½	12½	50/–	+⅛	5 0 0
Elecl. Switchgear (10/–)	16	10	20/–	..	5 0 0
English Electric ..	10	10	35/–	..	5 14 2
Ensign Lamps (5/–)	25	25	16/3	..	7 13 10
Ericsson Tel. (5/–) ..	25*	22*	37/6	..	2 18 8
Ever Ready (5/–) ..	40	40	28/–	..	7 2 10
Falk Stadelmann ..	7	7½	17/6	..	8 11 6
Ferranti Pref. ..	7	7	26/3	..	5 6 10
G.E.C. :					
Pref.	6½	6½	32/6	..	4 0 0
Ord.	20	17½	80/–	..	4 7 6
Greenwood & Batley	15	13	22/6	..	11 11 2
Hall Telephone(10/–)	15	10	13/9	..	7 5 6
Henley's (5/–) ..	20	20	21/3	..	4 14 1
4½% Pref. ..	4½	4½	21/3	..	4 4 8
Hopkinsons ..	15	15	46/3	..	6 9 10
India-Rubber Pref.	5½	5½	21/3	..	5 3 6
Intl. Combustion ..	32½	30	100/–	..	6 0 0
J. Lucas	15	15	58/9	..	5 2 0
Johnson & Phillips	15	15	51/3	+⅛	5 18 10
Lancashire Dynamo	20	20	52/6	..	7 12 5
Laurence, Scott(5/–)	15	15	10/9	+3d.	6 19 6
London Elec. Wire	7½	7½	22/6	..	6 13 4
Mather & Platt ..	13½	10	43/3	+⅛	4 12 6
Metropolitan Elec. Cable. Pref. ..	5½	5½	21/3	..	5 3 6
Murex	20	20	86/3	+¼	4 12 8
Pye Deferred (5/–)	25	25	13/9	..	9 1 10
Revo (10/–) ..	5	20	23/9	..	8 8 5
Reyrolle	12½	12½	55/–	..	4 10 3
Siemens Ord. ..	7½	7½	25/–	+⅛	6 0 0
Strand Elec. (5/–) ..	4	2	2/–	..	5 0 0
S. Smith (1/–) ..	37½	50	6/3	..	8 0 0
Switchgear & Cowans (5/–) ..	10	15	8/9	..	8 11 6
Tel. Condenser(10/–)	Nil	5	11/3	+⅛	4 9 0
T.C. & M.	10	10	40/–	..	5 0 0
Telephone Mfg.(5/–)	9	9	7/3	..	6 4 2
Tube Investments ..	23¾	23¾	95/–	+6d.	5 0 0
Vactric (5/–) ..	4	Nil	2/6	..	—
Vickers (10/–) ..	10	10	16/6	+3d.	6 1 3
Ward & Goldstone (5/–)	20	20	16/6	..	5 19 9
Westinghouse Brake	17½	10	45/–	+3/–	4 9 0
Walsall Conduits(4/–)	55	55	31/3	..	7 0 9
West, Allen (5/–) ..	7½	7½	3/9	..	10 0 0

* Dividends are paid free of Income Tax.

Stocks and Shares (*Concluded from page* 108)

Telephones, Johnson & Phillips and Siemens are all ⅛ up. Arons have responded to the dividend announcement with a rise to 20s. 6d. Vactric preference, which have lain undisturbed at 7s. 6d. since last April, are now 10s. A small demand lifted Laurence, Scott to 10s. 9d.

Victoria Falls

The ordinary shares of Victoria Falls Power Co. have hardened to 77s. 6d. bid, which is practically the best price touched for some time past. On the basis of the present dividend which the company is paying—15 per cent.—the return of £3 17s. 4d. at 77s. 6d. looks modest enough. It is, however, impossible to argue that anything stands too high, for the simple reason that investment persists in absorbing the shares, whether they look overvalued or not. The company's participating preference are now quoted at 37s. 6d., which, on the 10 per cent. dividend the company has been distributing for some time past on this issue, gives a yield of £5 6s. 8d. per cent. The risk, previously indicated here, is that these preference shares may possibly be expropriated by the Government at their par price of 20s. in 1950, upon the Union of South Africa Government giving two years' previous notice of its intention to take over the concern. The company's report shows an advance of £184,000 in net revenue, at £2,193,334, but depreciation and taxation take the colossal sum of £275,000 more than last year. Due to this, the net profit of £583,000 is £98,700 lower.

Brush Electrical

The Brush Electrical Engineering Co.'s annual report shows the trading profit for 1940 to have risen by about £60,000 as compared with the previous year. The profit carried to the balance sheet is £52,500 against £31,700. The company has established a new reserve fund of £60,000, this including £35,000 reserve for depreciation and renewal of plant. The company owed the Bank £76,000 against £65,000 last year, the difference being explained by the addition to stock and work in progress. The price of the 5s. shares is lower at 3s. From the report, it would appear that the company has a reasonable chance of recovering something of the prosperity that it enjoyed in times past.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—SYDNEY.—November 13th. County Council. 33,000-V switchgear and associated equipment for Pyrmont power station. Specification 538.

Brighouse.—August 30th. Electricity Committee. 300-kVA transformer and switchgear. (August 8th.)

Epsom and Ewell.—August 18th. Electricity Department. H.v. and l.v. cable. (August 8th.)

Gravesend.—August 20th. Architect's Department. Water heating, water supplies, and electrical services at the police headquarters and fire station. (August 1st.)

New Zealand.—POSTS AND TELEGRAPH DEPT.—August 25th. Condensers and 3-conductor cords. August 29th. Cadmium-copper binders and tapes. September 1st. Tumbler switches and fuses. September 2nd. 60 tons of copper wire. September 5th. 60 miles of tinned copper wire.
AUCKLAND HARBOUR BOARD.—September 30th. Ten 5-ton electric cranes.

Warrington.—September 1st. Electricity Department. Cables, earthenware conduits, slabs, tiles and covers. (August 8th.)

Orders Placed

Blackburn.—Town Council. Accepted. Electric dish washing machine.—James Stott & Co. (Engineers). Vegetable steamer.—Mabbott & Co. (Manchester).

Glasgow. — Police Committee. Accepted. Emergency generating plant for the transmitter house in connection with police wireless (£351). —R. A. Lister & Co.
Electricity Committee. Accepted. Three rotary exhausters for ash handling plant (£1,814). —Babcock & Wilcox.

Liverpool.—Electric Power and Lighting Committee. Recommended. Supply and erection of a boiler unit, together with the necessary ancillary plant and pipework.—Babcock & Wilcox.

Nottinghamshire.—County Health Committee. Accepted. Kilton Hall Hospital. Operating theatre lamp (£100).—G.E.C. Duo-therapy lamp (£71).—Hanovia.

Sheffield.—Electricity Committee. Accepted. Condenser tubes for power station (£1,722).—Yorkshire Copper Works. Plant protective works (£3,040).—Mitchell Engineering Co.

Southport.—Electricity Committee. Accepted. Ring main unit for power station switchgear (£239).—Ferguson, Pailin.

Spalding.—Gas, Water and Electricity Committee. Installation of apparatus and provision of relays (£1,870).—Metropolitan-Vickers Electrical Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Alnwick.—British Restaurant at Green Batt; U.D.C. surveyor.

Blackpool.—Workshop, Park Road; S. Thomas.
Central kitchen, Revoe school; J. & R. Fenton.

Bolton.—Transformer chamber at brickworks, Hypatia Street; Taylors Bricks, Ltd.

Boston.—Alterations to laundry at Institution for Holland (Lincs) C.C. (£2,100); W. Smith, county architect, County Hall.

Bromsgrove.—Additions to premises; Essambee Plaster Co., Ltd., Alcester Road.

Chell Heath.—Methodist church for the Methodist Union; the secretary.

Chesterfield.—Canteen, Brimington Road; S. T. Rodgers.
Factory, Brimington Road; Robertson & Woodcock, Ltd., confectioners.

Cleobury Mortimer.—Fire station (£600) for Ludlow R.D.C.; G. W. Graham, surveyor, Council Offices, Ludlow.

Consett.—Community feeding centre, Front Street; T. P. Leath, U.D.C. surveyor.

Darlington.—British Restaurants; borough engineer.

Durham.—Alterations to No. 37, Old Elvet for the C.C. (£600); T. Coates, builder.
Conversion of cottages into feeding centre, for the R.D.C. (£650); S. Dodds, surveyor.

Failsworth.—Day nursery, and adapting Bethel Schools as British Restaurant, for U.D.C.; surveyor, Council Offices, Oldham Road.

Gateshead-on-Tyne.—Offices for Maple & Gillett, James Street; R. Gofton & Son, contractors, Front Street, Monkseaton, Whitley Bay.

Glasgow.—Cleaning depot, Kilgarth Farm (£6,000); city engineer.

Guildford.—Nursery centre unit, The Firs, for E.C.; borough engineer, Municipal Offices, High Street.

Harpurhey.—Alterations, Moston Lane, for shops and house; architect, G. E. Green, 5, Beaver Street, Manchester.

Hartlepool.—Two British Restaurants; T. H. Mier, borough engineer.

Hereford.—Shop reconstruction, St. Owen Street; C. Booth.

Hinckley.—Conversion of premises into British Restaurant (£1,500), for U.D.C.; A. S. Atkins, clerk, 16, Station Road.

Histon.—Isolation hospital; county architect, Cambridge.

Ilford.—Canteen and dormitory blocks, Barkingside, for B.C.; L. E. J. Reynolds, borough engineer, Town Hall.

Ince.—British Restaurant, for U.D.C.; surveyor, Council Offices, Ince Green Lane, Wigan.

Jarrow (Co. Durham).—British Restaurants at Grange School and Monkton Road School; J. S. Weir, borough engineer, Town Hall.

Keighley.—Additional accommodation at Riddlesden C.E. Schools, for E.C.; E. G. Felgate, borough architect, College Street.

Kettering.—Additions to boot factory; Smith & Foster, Ltd., boot manufacturers, Morley Street.

Leeds.—Completion of central block of new buildings; University Senate.

Malton.—Farm workers' hostel, for R.D.C.; surveyor, R.D.C. Offices.

Manchester.—Seven emergency feeding depots; city engineer.

Three additional school canteens for E.C.; J. B. Braz, surveyor, Education Offices, Deansgate.

Menai Bridge.—Adaptation of Brynian and Granville, as evacuees' hostel, for U.D.C.; surveyor, Council Offices.

Nantwich.—Adaptation of premises, Riverside, as hostel; Cheshire Agricultural Committee.

Newcastle-on-Tyne.—British Restaurant at the Grand Assembly Rooms; C. Parr, city engineer, Town Hall, Newcastle.

Newcastle (Staffs.).—Alterations to dairy, Queen Street, Porthill; S. Morrey, dairyman, 15, Queen Street, Porthill.

Pembury.—Adaptation of buildings, with X-ray plant, for Kent C.C.; W. H. Robinson, county architect, Springfield, Maidstone.

Ponteland (Northumberland).—Land workers' hostel; Middlemiss Bros., Ltd., Stepney Bank, Newcastle-on-Tyne.

Rotherham.—Workshop, Doncaster Gate; Lilleker Bros.

Runcorn.—Conversion of premises for auxiliary fire station, and adaptation of Brunswick Sunday school as restaurant, for U.D.C.; A. B. Cunningham, surveyor, Town Hall.

Seaham.—Community feeding centres; J. B. Abbey, U.D.C. surveyor.

South Shields.—British Restaurant for the T.C. (£2,000); acting borough engineer.

Substation for Readhead & Sons, shipbuilders; L. J. Couves and Partners, Carliol House, Newcastle-on-Tyne.

Staindrop (Co. Durham).—Agricultural workers' hostel; Kitching & Co., architects, 21, Albert Road, Middlesbrough.

Stockport.—Alterations to Swan Hotel, Shaw Heath; architects' department, Wilson's Brewery Co., Monsall Road, Newton Heath, Manchester.

Stretford.—Mortuary at Trafford Park, for T.C. jointly with Urmston U.D.C.; E. Parker, borough surveyor, Town Hall.

Adapting various premises as restaurants; P. Howard, architect.

Fire station at the docks (£2,250); E. Parker, borough engineer, Town Hall, Talbot Road.

Sunderland.—Workshop at Doxford's Shipyard; firm's own architectural staff.

Canteen and kitchen at the works of J. Jobbling & Co., Wear Glass Works, Sunderland; J. Potts & Son, 57, John Street, Sunderland.

Sussex.—Hostels for land workers, Rusper, Loxwood and Southwater; Ministry of Works and Buildings.

Tideswell (Buxton).—Improvements and restoration at parish church (£2,000); Rev. R. F. Edwards, vicar.

Wellington (Salop).—Fire station and firemen's quarters, Donnington Wood Farm, for R.D.C.; J. B. Cooper, architect, 177, Corporation Street, Birmingham 4.

Wollaston.—Women's hostel, for Northants C.C.; G. H. Lewin, county architect, County Hall, Northampton.

Cleaning Street Lamps

AN unusual travelling outfit for cleaning the glassware of the overhead electric lamps used for street lighting has recently been put in service by the Cincinnati Gas and Electric Co., Ohio, U.S.A.

The vehicle's platform, behind the driver's seat, is raised and lowered by means of a power-driven winch with a cable on each side of the chassis. When lowered for travelling the platform floor is at a height of 9ft. 6in. from the ground and it rises to 15ft. 9in., enabling lamps mounted at heights up to 23ft. to be dealt with. The platform is arranged on a geared rack so that it can be run out to a distance of 6ft. 4in. from either side of the truck in order that the machine can be used even when cars are parked on the sides of the street. How the platform is supported when in the run-out position and with so large an overhang is, however, not clear from the description given in the *Electrical World*

Behind the tower is a windowed van body measuring about 7 ft. by 6 ft. 8 in. with two 26-in.-wide doors. Along one side of the van interior are lead-lined acid solution and rinsing baths with an acid drain between them. The acid bath is provided with a heating coil through which hot water from the engine radiator is circulated. Along the rear wall of the van are also a water drain and storage space for spare lamp globes. Three men are employed on the vehicle, the driver, who raises or lowers the tower; the man who removes and refixes the glass ware and changes the lamp bulbs when necessary; and the cleaner who hands a clean globe to the second man as a dirty one is removed. The dirty globes are cleaned during the time the vehicle is travelling from lamp to lamp.

It is claimed that, in good weather, the three men can deal on the average with 60 per cent. more globes than is possible with the same number of men working separately by the hand method of cleaning by buckets and portable ladders. Another advantage is that globe-cleaning work can be carried on regardless of the weather.